DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

Energy Security Target and Safeguard

Consultation paper

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Minister’s foreword

Last year I released the NSW Electricity Strategy, which set out a roadmap for how the NSW Government will work with the private sector, energy market institutions, households and businesses to secure a sustainable electricity future in New South Wales.

As our energy system transitions, we need to keep energy affordable and reliable for our homes, hospitals, schools and local businesses so they can stay competitive in fast-paced, global markets.

This is where our new Energy Security Target and Energy Security Safeguard come in. The Energy Security Target will set a benchmark for reliability to make sure we keep the lights on. The Energy Security Safeguard will drive the rollout of cost-effective energy efficiency and peak demand reduction technologies.

Our vision for these initiatives is to set one of the highest targets for reliability anywhere in the world while delivering affordable and sustainable energy for the people of New South Wales.

This paper is the next step for that vision.

To get this right, we need to draw together insight and expertise across government, industry and academia. This paper is the start of our consultation, which will be supported by a public forum in the coming months. I look forward to discussing these initiatives with you and receiving your valuable feedback. Together, we will deliver the energy system the people of New South Wales need for the decades ahead.

I am also pleased to release a Draft Statutory Review Report of our Energy Savings Scheme. The scheme has been hugely successful to date, helping projects that will deliver about 27,000 gigawatt hours of energy savings and $5.6 billion of bill savings. Since it started, the scheme has also helped avoid 12.8 megatonnes of emissions. The initiatives in this paper aim to build on that record of success and prepare our energy grid for the future.

The Hon. Matt Kean MP

Minister for Energy and Environment

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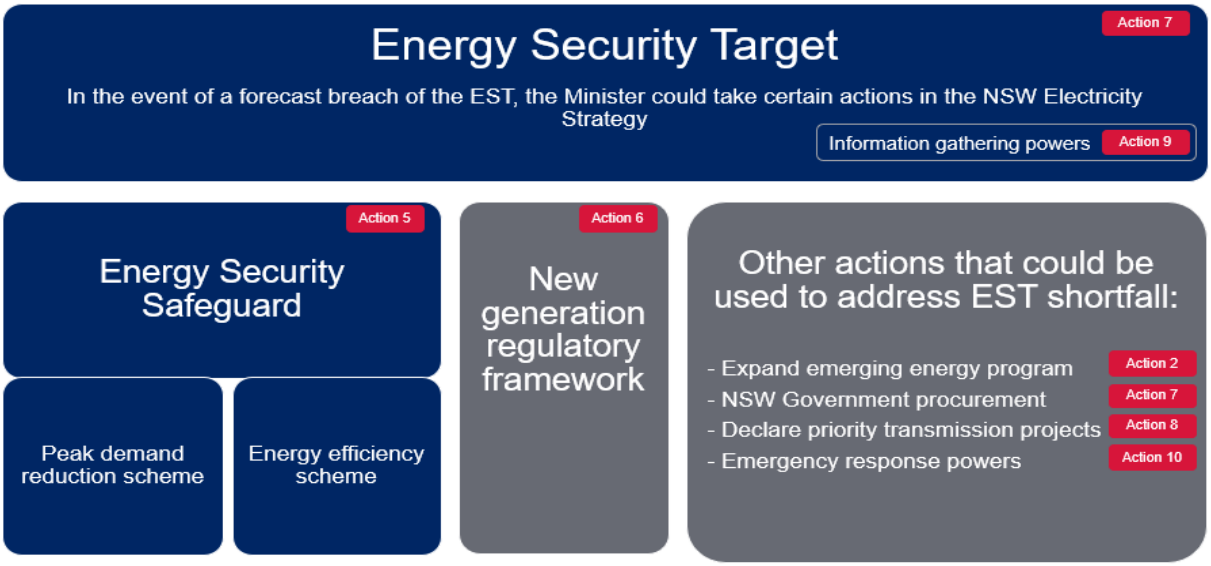
Executive summary

The electricity system in New South Wales is under increasing pressure. The planned retirement of ageing power stations is set to remove significant capacity across the National Electricity Market (NEM). The electricity grid is becoming congested and energy bills for households and businesses remain high.

To meet these challenges, in November 2019 the NSW Government released the NSW Electricity Strategy, which sets out a plan for a reliable, affordable and sustainable electricity future.

This consultation paper seeks feedback on the implementation of the Strategy's Energy Security Target (EST) and the Energy Security Safeguard (the Safeguard). The NSW Government will also take steps to develop a market-based regulatory framework that ensures investment in new energy generation in New South Wales. The figure below shows the connection between the EST, the Safeguard and the generation regulatory framework. These elements are mapped to the actions of the Electricity Strategy.



The consultation paper covers the areas shaded blue

Part 1 – Setting an Energy Security Target to deliver a reliable energy system

The NSW Government has set the EST to give the market certainty about how much new electricity is needed to deliver a reliable energy system over the medium to long term. The EST will serve as an additional framework that complements the existing national reliability measures, while bolstering the state's electricity resilience.

To monitor the EST, the NSW Government will introduce information gathering powers and a confidential register of key projects which would contribute to meeting the EST. This will better equip the state, in partnership with the Australian Energy Market Operator (AEMO), to ensure any forecast breaches of the EST are dealt with proactively to strengthen the resilience of the electricity system.

The electricity system is too important to fail. If it looks like the EST will not be met, the NSW Government will act to maintain reliability. Potential actions include increasing the Safeguard's targets, using whole-of-government procurement to incentivise new reliable generators, offering more industry grants through the Emerging Energy program and fast-tracking additional priority transmission projects.

The NSW Government is seeking feedback from stakeholders on:

- how the EST is defined
- actions available to the NSW Government in response to a potential breach of the EST, particularly the timing of that action
- the operation of the register and how to integrate it with existing reporting requirements to AEMO.

Part 2 – Introducing the Energy Security Safeguard

The NSW Government will build on the success of the NSW Energy Savings Scheme (ESS) by reconstituting it as the Energy Security Safeguard. The Safeguard will include an expanded and extended ESS and a new scheme to support peak demand reduction. Together, the two schemes will deliver bill savings for NSW consumers, while supporting the reliability and sustainability of our electricity system.

2.1 – An expanded and extended ESS

The Safeguard will extend the ESS to 2050, with energy savings targets increasing gradually to 13% by 2030.

The scheme will cover a wider range of activities that reduce demand on electricity and gas networks, such as switching from natural gas to biogas. In line with the NSW Government's aspirations to achieve net zero emissions by 2050, the Safeguard could also include switching from high-emission fuels such as onsite diesel to cleaner alternatives.

The NSW Government is seeking feedback from stakeholders on:

- increased energy savings targets for the scheme, including the rate of increase
- penalty levels and exemptions
- the expansion of eligible energy saving activities under the scheme.

2.2 – A new peak demand reduction scheme

The second component of the Safeguard will be a market-based certificate scheme to encourage peak demand reduction. The scheme will increase the capacity to reduce demand at times when electricity spot prices are high or there is a supply–demand imbalance. The scheme may support:

1. **Peak demand savings** from appliances and equipment that use more energy at peak times than otherwise, or reliably save energy during peak periods. Examples of this include refrigeration and air conditioning which work harder when it is hot.
2. **Peak demand response** from appliances and equipment that can be controlled to reduce demand at peak times. The reduced service or output is not recouped later. In the residential sector this includes air conditioners. The commercial and industrial sectors can temporarily reduce operating load of equipment such as air conditioning and refrigeration systems.
3. **Peak demand shifting** from appliances and equipment that can be changed to shift demand away from peak periods. This requires either storage (such as batteries, electric vehicle chargers and hot water systems) or flexibility in time of use (such as pool pumps).

The NSW Government seeks feedback from stakeholders on the scheme design, including activities that could be included in the scheme, priority calculation methods and the proposed approach for establishing scheme liability.

2.3 – Scheme administration and regulation

The NSW Government is committed to continuous improvement of regulations to ensure their continued effectiveness and efficiency. This section seeks feedback on the Government's vision for excellence in administration and operation of the Safeguard. It focuses on scheme rules and regulations, the administrator and regulator, scheme participants and service providers, and government policy setting.

Next steps

The NSW Government invites written submissions from stakeholders by **5pm on Monday, 22 June 2020**. The NSW Government will hold an online public forum during the consultation period.

Introduction

The electricity system in New South Wales is under increasing pressure. The planned retirement of ageing power stations is set to remove significant capacity across the National Electricity Market (NEM). The electricity grid is becoming congested and energy bills for households and businesses remain high.

To help meet these challenges, the NSW Government released the NSW Electricity Strategy (DPIE 2019a), which sets out the Government's plan for a reliable, affordable and sustainable electricity future. This includes three layers:

1. supporting the market to deliver reliable electricity at the lowest price, while protecting the environment
2. setting an Energy Security Target (EST) to ensure New South Wales has enough generation capacity to cope with unexpected generator outages during periods of peak demand, such as heatwaves
3. ensuring the NSW Government has sufficient powers to deal with an electricity emergency, if one arises.

This consultation paper considers actions that will support the first two layers of the Strategy:

- the Energy Security Target and information gathering powers
- the Energy Security Safeguard.

The EST aims to give the market certainty about how much new electricity is needed to deliver a reliable energy system over the medium to long term. It will serve as an additional framework that complements the existing national reliability measures, while bolstering the state's electricity resilience.

The NSW Government will build on the success of the NSW Energy Savings Scheme (ESS) by extending and expanding it under a new name, the Energy Security Safeguard (the Safeguard). The Safeguard will deliver bill savings for NSW consumers, while supporting the reliability and sustainability of our electricity system. Together, the schemes are projected to save households up to $15.50 per year on their electricity bills.[1]

The Safeguard will include:

- an ESS that will run until 2050 with its energy savings target gradually increasing to 13% by 2030
- a new certificate scheme to support technologies that reduce demand at peak times.

The NSW Government will also take steps to develop a market-based regulatory framework that ensures investment in new energy generation in New South Wales. Figure 1 shows the connection between the EST, the Safeguard and the generation regulatory framework. These elements are mapped to the actions of the Electricity Strategy.

[1] Modelling for the Department by ACIL Allen, for more information please refer to Appendix C

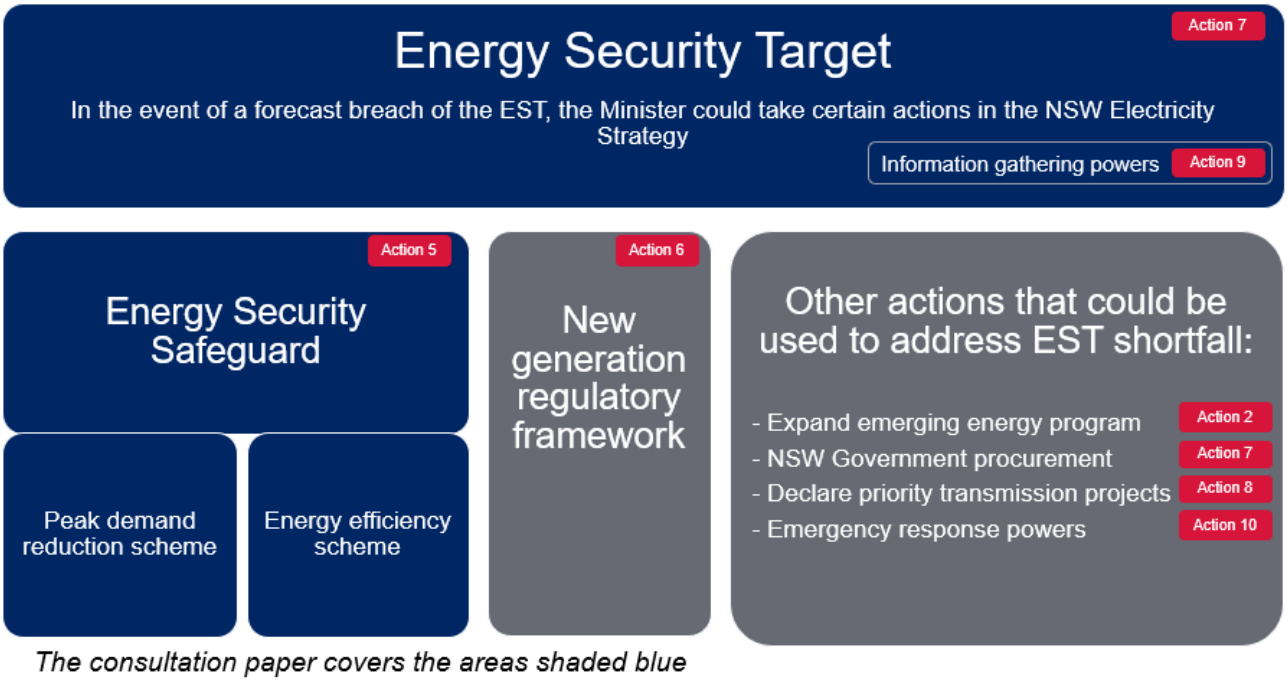


Figure 1 **The relationship between the EST, the Safeguard and the generation regulatory framework**

Call for submissions

The NSW Government invites submissions from all interested parties on reforms set out in this consultation paper.

An online survey with the consultation questions from this paper will be available on the NSW Government Consultation website.

You can also email your submission. Identify your submission with the subject: 'Your Name – Energy Security Target and Safeguard 2020', and send it to:

Director, Climate Change and Energy Savings Policy
NSW Department of Planning, Industry and Environment
energysecurity@environment.nsw.gov.au

To help us consider your submission, please set out your responses against the consultation questions identified in each section of this paper. You may wish to respond to some or all the questions raised when responding to the survey or making a written submission.

The NSW Government will hold an online stakeholder forum seeking feedback on more detailed design aspects of the EST and Safeguard.

Closing date

The closing date for the survey and written submissions is **5pm on Monday, 22 June 2020**. Submissions received after this deadline may not be considered.

Publication of submissions

The NSW Government is committed to an open and transparent process, and all survey responses and submissions will be made publicly available. Written submissions should be provided as documents that can be published on the NSW Planning, Industry and Environment website.

If you wish for your written submission to remain confidential, please clearly state this in your submission, and only your organisation's name will be published. We will remove personal details from submissions made by individuals.

Please be aware that even if you state that you do not wish certain information to be published, there may be legal circumstances that require the NSW Government to release that information (for example, under the *Government Information (Public Access) Act 2009*).

Part 1: The NSW Energy Security Target

This part sets out, and seeks feedback on, the NSW Government's objectives for the Energy Security Target (EST) and the information gathering powers that will support its administration.

Setting an Energy Security Target

A reliable power system has enough generation, network capacity and demand response to match customer demand. A primary risk to a reliable power system is a capacity shortfall. A capacity shortfall might occur for various reasons such as one or more generators experiencing unplanned outages, or because demand is very high during a heat wave.

The NSW Government has set a NSW Energy Security Target to ensure the state takes appropriate action to maintain a reliable supply over the medium to long term. The EST provides a signal to market participants of the NSW Government's expectation for investment in new equipment and infrastructure to improve reliability over the medium to long term (three to six years), such as new transmission or dispatchable generation projects or improvements to household and business energy efficiency.

The EST complements the NEM's Reliability Standard. Like the Reliability Standard the EST cannot guarantee absolute reliability for NSW electricity consumers. The Reliability Standard is used to set or trigger price signals that encourage more supply in the short term (less than three years) through mechanisms including the Market Price Cap, Retailer Reliability Obligation and Reliability and Emergency Reserve Trader program. These NEM mechanisms provide a safety net to maintain a reliable supply in the near term.

The EST is set at the capacity level needed to meet customer demand during a summer heat wave while maintaining a reserve margin to account for the unexpected loss of two of the state's largest available generating units.[2]

Energy Security Target = maximum demand + reserve margin

Maximum demand

The EST will use the Australian Energy Market Operator's (AEMO) maximum demand forecasts. These forecasts are chosen to reflect 10% probability of exceedance (POE10) conditions – this implies that the forecast is expected to be exceeded once every 10 years.

AEMO's measure of demand refers to operational demand. Operational demand represents electricity sent out by all scheduled and semi-scheduled generation, as well as non-scheduled generation greater than or equal to 30 megawatts (MW). Operational demand accounts for energy related initiatives or policies such as energy efficiency and peak reduction schemes but does not include demand side response from market participants. However, the EST will include the contribution of demand response to supply.

[2] The EST is separate from other targets that operate in the schemes outlined in this consultation paper (i.e. the energy savings target and potential peak reduction targets under the Energy Security Safeguard).

Reserve margin

The reserve margin will act as a buffer to ensure there is enough supply to meet demand while also covering for the credible loss of the two largest available NSW generating units. The two largest scheduled generating units in New South Wales are typically at Eraring Power Station (each unit 680 MW). The loss of these is the current contingency event that will be considered for the reserve margin of the EST (1360 MW).

As larger renewable energy projects are commissioned, the loss of the largest wind or solar farm may become a credible contingency event in the future. The NSW Government will monitor the reserve margin at regular intervals to ensure appropriate contingencies are covered.

Meeting the target with firm supply

The EST can be met by electricity generation, imports from interconnectors with other NEM regions and demand side response; however, only firm capacity (or actual capacity known to be available during peak conditions) will be considered. For instance, Bayswater's nameplate capacity is 2640 MW but its summer rating of firm capacity as defined by AEMO is 2545 MW.

Electricity generation capacity

The nameplate capacity of generators indicates their intended maximum capacity. Generators with a nameplate capacity greater than or equal to 30 MW that can dispatch through AEMO's central dispatch process are classified as either:

- scheduled, or
- semi-scheduled, i.e. systems with intermittent output such as wind or solar farms.

These are the generators that contribute to operational demand. Non-scheduled generating units with an aggregate capacity of 30 MW or more also contribute to operational demand.

For ageing thermal generating units that pose reliability risks, it is prudent to de-rate these units based on the unit's market availability for the past three summer peak periods. Currently the Department of Planning, Industry and Environment (the Department) only de-rates the Liddell Power Station. While AEMO regards Liddell's summer firm capacity to be 1800 MW, the Department considers its firm capacity to be 870 MW because of its availability during recent summer peak periods.

For variable renewable generators during peak periods, the Department estimates that solar contributes 13% of capacity while wind contributes 10% of capacity. This is based on an analysis of a sample of NSW peak demand periods over the past three summers using the 10^{th} percentile output from existing wind and solar power stations.

Interconnector imports

The interconnected nature of the NEM means New South Wales can import power from neighbouring Victoria and Queensland to support its supply capacity. Similar to generators, interconnectors are technically capable of transferring up to their maximum ratings but are limited during peak demand periods. Table 1 shows the firm capacities of interconnectors as determined by AEMO.

Table 1 Interconnector firm capacities

Interconnector	Firm capacity to NSW (MW)
Terranorra	150
QLD to NSW (QNI)	1095–1145 (with Sapphire generation at 0) 815–915 (with Sapphire generation at 270 MW)
VIC to NSW (VNI)	700

Refer to AEMO's latest Integrated System Plan (ISP) (AEMO 2019a) input and assumptions document for further information.

Demand side participation

Another way of meeting the EST is through changes in end-use customer electricity consumption. Known as demand response, customers are encouraged to reduce their demand during certain periods through incentive payments. This mechanism is widely used in commercial and industrial sectors and is anticipated to play a significant role in the residential sector as technology matures.

AEMO has developed a data portal for participants to submit their demand response information. This enables AEMO to develop more accurate electricity load forecasts.

Currently, AEMO has around 90 MW of demand side participation in New South Wales registered in its demand side portal. For more information refer to AEMO's Demand Side Participation Information Guidelines and 2019–20 ISP Input and Assumptions workbook.

Current outlook for the EST

To illustrate the concepts described above, the Department has used information from AEMO to project an outlook for the EST; this is shown in Figure 2. The demand side participation in Figure 2 does not include any forecast capacity from the Safeguard's new peak demand reduction scheme.

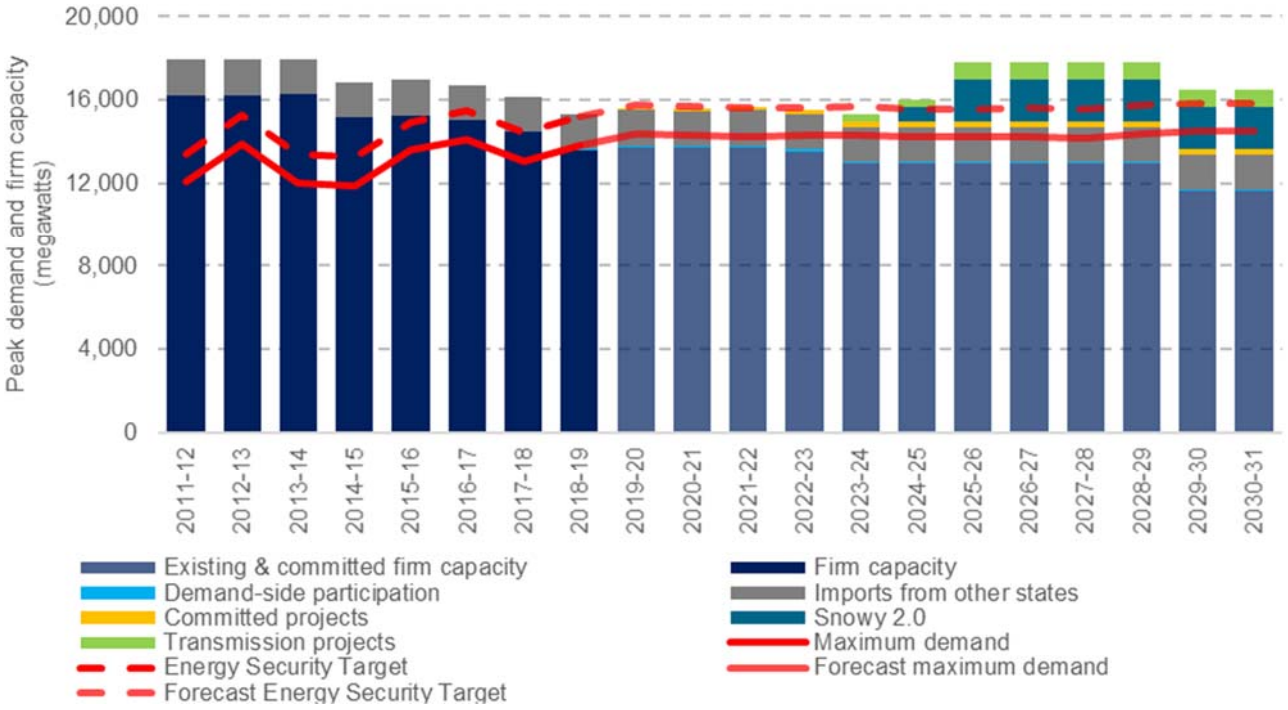


Figure 2 Outlook for the EST

New South Wales currently has a tight reserve condition with firm supply just meeting the forecast EST. This situation is expected to persist through the early 2020s.

In 2023–24, without further investments other than projects already committed, NSW firm supply would not be expected to meet the EST; however, this gap is expected to be largely filled by projects supported by the existing NSW Emerging Energy program and private sector investments.

In the mid-2020s, Snowy 2.0 will provide enough firm capacity for New South Wales to substantially exceed the EST. By 2029–30, the anticipated retirement of Vales Point Power Station will again tighten the balance between supply and demand.

Consultation questions

1. Is the approach to assessing firm capacities from generators, interconnectors and demand response used to meet the EST reasonable and appropriate? Is there an alternative approach?
2. Is the approach to applying the capacity factors for wind and solar generators reasonable and appropriate?
3. Are AEMO's maximum demand forecasts appropriate for use in determining the EST? Should alternatives be considered (e.g. TransGrid's forecasts)?
4. How often should EST updates be published?

Powers to gather information

In consultation with AEMO, the NSW Government will closely monitor the market for any forecast breaches of the EST. To ensure the NSW Government has sufficient and accurate information for this purpose, and in the context of the Government setting targets as part of the Safeguard, additional information gathering powers will be required.

These powers will include the ability to issue notices to produce documents or require industry participants to provide project information. This information will be used to set Safeguard targets,

identify possible capacity shortfalls, and assess options to address such shortfalls, including to assess whether government action may give rise to unintended consequences. Commercially sensitive information will be subject to strict confidentiality provisions.

Objective of information gathering powers

The NSW Government will maintain a confidential register of key projects which would contribute to the EST. The register will include key potential, planned and current projects, information about key decision dates, critical path delivery timeframes and other information required to assess projects. The register will enable the NSW Government to identify whether the market is 'on track' to meet the EST, or whether there are risks of forecast breaches that need to be addressed.

To inform the register, the NSW Government will introduce requirements to report on projects that would contribute to the delivery of the EST, and powers to gather information about these projects, on an ongoing basis and as required.

Operating framework

Who will be required to provide information to the register?

Any entity responsible for a potential, planned or current project that may contribute to meeting the EST could be required to provide information to the register. Entities may include:

- generators registered as such by AEMO[3]
- intending participants[4] who intend to commence activities as generators
- Distribution System Operators (DSOs), aggregators and Virtual Power Plant (VPP) operators[5]
- providers of demand response services
- network operators receiving connection requests.

Who will the information go to and who will maintain the register?

The information will be required to be provided to the Secretary of the Department. The Department will be responsible for maintaining the register in accordance with the NSW Government's Information Management Framework requirements (DFSI 2018). Opportunities to leverage existing data and information gathering platforms managed by national market bodies will be further investigated to ensure there is no unnecessary duplication of reporting requirements. Additionally, agreements with these bodies to collect and monitor the information required on our behalf will be explored.

Legislative provisions will ensure that information provided which is commercial-in-confidence cannot be shared with any other parties or used by government for purposes other than informing decisions relating to the EST and the Safeguard.

[3] See clause 2.2 of the National Electricity Rules (NER).

[4] See clause 2.7 of the NER.

[5] These entities refer to the operation and management of distributed energy resources (DER). An aggregator is a party that facilitates the grouping of DER to act as a single entity when engaging in power system markets or selling services to the system operator. A DSO refers to the functions of distribution level coordination and optimisation of multiple DER aggregators in multiple markets operating at distribution level. A VPP is a portfolio of DER – such as rooftop solar, batteries and controllable loads – installed behind-the-meter that can be collectively managed and controlled to deliver services like a conventional power plant.

What information will need to be provided and in what format?

Information required to be provided for the register will, to the greatest extent possible, avoid duplication of information provision requirements under current regulatory settings. The information required for the register may include, but not be limited to:

- key project decision dates
- critical path delivery timeframes
- expected nameplate capacity and production rates.

The information must be provided to the Department in digital format unless requested otherwise.

Industry already provides a significant volume of information to AEMO about New South Wales' electricity demand and generation capacity. The NSW Government will work to ensure that AEMO shares this information with the Government and that cooperation with national market bodies that have relevant information gathering powers is maximised. This will ensure that industry does not need to provide the same information to multiple organisations, and that the data and evidence being relied upon is consistent between the NSW Government and energy market bodies.

When will information need to be provided?

It is proposed that the NSW Government require two types of reporting:

- regular reporting to the Secretary of the Department
- ad-hoc reporting, including notices to produce documents or answer questions, at the request of the Secretary of the Department.

What will the information be used for and how will the information be evaluated?

The information will be used to:

- maintain the confidential register of key potential, planned and current projects that would contribute to delivery of the EST
- inform the NSW Government of any potential forecast breaches of the EST, and if any action should occur in light of a potential breach.

Information on key potential, planned or current projects will be evaluated to assess whether those projects will form part of the outlook on firm capacity to contribute to achieving the EST. As noted above, key factors considered will include timing of when new capacity is expected to come online, expected nameplate capacity and production rates, and the existence of a firm commitment to construct a project.

New capacity from upcoming private projects that are assessed as being 'committed' or 'committed*' under AEMO's project commitment framework will be included in the outlook on firm capacity. Table 2 summarises AEMO's approach to project commitment status.

Table 2 AEMO's project commitment categories

Project commitment status	Definition
Committed	Projects that will proceed, with known timing, satisfying all five of the commitment criteria (Site, Components, Planning, Finance and Date)

Project commitment status	Definition
Committed*	Projects that qualify as 'advanced'[6] and where construction or installation has also commenced. Typically, committed* projects are included in AEMO's sensitivity analysis for Marginal Loss Factor calculations and in the base case for reliability assessments.

Additionally, where projects have a commitment from either the NSW or Commonwealth government to support the construction of a project, these projects may also be included in the outlook on firm capacity. Projects of this nature include Snowy 2.0 and the QNI transmission project.

What happens if information is not provided?

A penalty provision will be attached to the legislative requirements.

For example, the existing requirements to provide information in connection with an electricity supply emergency attracts a maximum penalty of 2000 penalty units in the case of a failure to comply by a corporation, or 100 penalty units in the case of an individual.

Consultation questions

5. Are the entities required to provide information to the EST register that are listed above suitable and adequate?
6. Is there other information that should be provided for the register beyond that listed above?
7. Are the types of projects that may contribute to meeting the EST described above suitable and adequate? How could prospective projects, beyond those identified as committed, be considered within the EST forecast for firm capacity?
8. Many market participants already have requirements to report to AEMO or other market bodies. Where do you consider there may be overlap with these existing requirements that the NSW Government could leverage to ensure industry does not need to report twice? Are there other ways the NSW Government could obtain this information?

Breaches of the Energy Security Target

Responding to a breach of the Energy Security Target

In consultation with AEMO, the NSW Government will closely monitor the market for any forecast breaches of the EST.

The time horizon for forecasts of the Energy Security Target is 10 years to align with AEMO's Electricity Statement of Opportunities report. Should a material breach of the EST be forecast in the medium term (i.e. within three to six years), the government will consider corrective actions to address this breach. The suite of corrective actions available to government may not be appropriate for forecast breaches in the shorter term as they typically have lead times of well over a year from when they are implemented. Forecast breaches in the longer term (e.g. beyond six years) may be too far in the future for government to be confident that corrective actions are required.

[6] AEMO defines 'advanced' projects as ones that are highly likely to proceed, satisfying Site, Finance and Date criteria, plus either Planning or Components criteria. Progress towards meeting the final criteria is also evidenced.

Consistent with the principles of the NSW Electricity Strategy, recommended government action, if any, in response to a breach of the EST must satisfy the following criteria:

- minimise cost to taxpayers and consumers
- not incentivise moral hazard such that market participants delay commercially justifiable investments to profit from any intervention
- be consistent with other NSW Government objectives, including protecting the environment
- take into account the duration and magnitude of any forecast breach.

The NSW Government has defined a limited number of actions that could be taken to correct a breach of the EST. This includes delivering one or a combination of the following:

- adjust scheme targets under the Safeguard to reduce operational demand
- increase program budgets or call for a further round of applications for the Emerging Energy program
- government electricity procurement
- make a priority transmission project declaration to remove capacity constraints in the transmission system.

Part 2: Energy Security Safeguard

The Energy Savings Scheme (ESS) as currently constituted is New South Wales' largest energy efficiency program. Since its launch in 2009, the ESS has supported projects delivering more than 27,000 gigawatt hours (GWh) of energy savings over their lifetimes. By lowering electricity demand, the scheme saved NSW households $13.50 a year on average on their bills.[7]

The NSW Government will build on the success of the ESS by legislating to extend and expand it under a new name, the Energy Security Safeguard. The Safeguard will include:

- an ESS that will run until 2050, with an energy savings target gradually increasing to 13% by 2030 and an expanded set of eligible activities
- a new scheme based on the ESS to support technologies that reduce demand at peak times, including flexible demand response.

The Safeguard will deliver bill savings for NSW consumers and is forecast to lower household electricity bills by $15.50 a year. Energy and peak demand savings projects supported by the Safeguard also generate significant economic activity and jobs, particularly in small-to-medium sized enterprises and regional areas.

In its new form, the ESS will continue to lower energy demand, and deliver affordability, reliability and emissions benefits for everyone in New South Wales.

The peak demand reduction scheme will increase the capacity to reduce demand at times when electricity spot prices are high or there is a supply–demand imbalance. It could also help reduce demand at times when networks are constrained.

Energy savings and peak demand reduction from the Safeguard contribute towards meeting the EST. Increasing the Safeguard's targets is also one of the potential actions the NSW Government may take to address forecast breaches of the EST.

Implementation timeframes

Noting the impacts of the COVID-19 pandemic, the NSW Government intends to introduce the Safeguard, or elements of the Safeguard, as soon as possible, subject to public health considerations. The NSW Government is seeking stakeholder feedback on a reasonable start date that balances industry needs to prepare for the introduction of the scheme with the broader benefits that flow from timely implementation.

Consultation questions

9. What would be a reasonable commencement date for the new energy saving and peak demand reduction targets? Please provide an explanation for your response.

[7] For further information, please refer to the Draft Statutory Review Report released as part of this consultation.

10. Could elements of either scheme, such as the early accreditation of certificates ahead of surrendering requirements, be brought forward? Please provide an explanation for your response.
11. What support does industry need to prepare for the introduction of the scheme? Please provide an explanation for your response.

2.1: Energy efficiency

This section sets out the NSW Government's rationale for extending the ESS to 2050 and seeks stakeholder feedback on the:

- increased energy savings targets for the scheme, including the rate of increase
- scheme penalty rate and exemptions
- inclusion of additional fuel switching activities.

The ESS is legislated to operate until 2025. This end date was recommended during the last review of the scheme in 2015, after which NSW Parliament extended it from 2020 to 2025.

Annual energy savings targets are set as a percentage of a scheme participant's total liable acquisitions from the NEM. The 2015 scheme review recommended an increase to targets. From 2019 to 2025 the target is set at 8.5% of energy demand.

The Energy Savings Scheme Rule of 2009 sets out recognised energy saving activities. These include activities that increase the efficiency of energy consumption by fuel switching, although this is restricted to switching between electricity and gas only.

The NSW Government will extend the ESS to 2050 and increase targets

As announced in the NSW Electricity Strategy, the NSW Government will extend the ESS to 2050 and set a more ambitious energy savings target. The target will increase gradually to 13% by 2030.

By extending the scheme and increasing the energy savings target, the NSW Government aims to:

- improve energy affordability and reliability for both households and businesses
- make emissions abatement available at low cost while making the transition to net zero emissions by 2050 cheaper and easier.

Substantial energy saving opportunities remain in New South Wales; however, systemic barriers such as split incentives, bias for short-term priorities, high transaction costs and information asymmetries prevent their take-up. For evidence that the ESS is meeting its objectives and that these remain valid, refer to the Draft Statutory Review Report, released as part of this consultation.

Section 105 of the NSW *Electricity Supply Act 1995* sets out the conditions under which scheme targets may be changed. These include an oversupply of energy savings certificates (ESCs) and significant changes to the policy or regulatory framework in which the scheme operates.

These conditions have been met. There is an ongoing surplus of certificates (IPART 2019a, p.3) and the introduction of the NSW Electricity Strategy represents a significant new policy direction for the operation of the scheme.

The current scheme targets were based on a cost–benefit analysis (CBA) of a range of potential options during the 2015 scheme review. A higher target will now deliver a greater net economic benefit for New South Wales. The main reasons for this increase in value are:

- due to higher wholesale prices, benefits from avoided gas and electricity generation are expected to be higher than previously forecast

- new and improved data are available to quantify the value of deferred electricity and gas network investment
- international commitments to action on climate change under the Paris Agreement have changed the economic value of avoiding carbon emissions through energy savings.

Key issues for increasing targets

Balancing affordability and reliability when increasing the target

As set out in the Electricity Strategy, the Safeguard's primary purpose is to reduce electricity prices, while supporting the reliability and sustainability of our electricity system.

The NSW Government will consider a range of factors when determining the rate at which to increase the energy savings target, including:

- maximising the net economic benefit of the scheme
- maximising bill savings for households and businesses
- the market's capacity to deliver energy saving activities
- improving reliability by achieving energy savings that address forecast supply risks.

New South Wales is acting to address potential capacity shortfalls. As part of this, the NSW Government will seek to confer new powers on the Minister to increase the Safeguard's targets, including the energy savings target, if there is a forecast breach of the EST. In such an event, the Government may choose to prioritise reliability over other factors for target setting.

Commercial lighting is approaching market maturity

Over the past five years, there have been significant changes to the energy efficiency market. Some of the available opportunities, such as commercial lighting upgrades, are approaching market maturity (Common Capital 2017, p. vii). As the share of commercial lighting activites in the ESS reduces, new activities will need to be taken up to meet the scheme's energy savings targets.

Preliminary analysis for the Department indicates opportunities to save 15,600 GWh of electricity and 11 PJ of gas each year remain in NSW (Jacobs 2019). These include efficient lighting in the residential sector and regional areas,[8] refrigeration, heating, ventilation and air conditioning (HVAC), process heating and motor systems.

Other new energy saving technologies and opportunities are also emerging. These include automated measurement and verification, app-based in-home display units, smart lighting and fuel switching (see section below for discussion of switching to cleaner fuels).

The market needs enough lead time to develop new business models to unlock these opportunities. This may influence both future targets and the timing of increases; however, submissions to the 2015 review argued that modelling for energy efficiency obligation schemes such as the ESS may underestimate the market's ability to drive down the cost of delivering energy efficiency projects (NSW Government 2015a, p.28).

Enabling emerging opportunities to reach the market

New technologies either lack approved standards or do not have calculation methods under the ESS. Rigorous standards and calculation methods for these technologies will be needed to verify a technology's performance.

[8] The NSW Government's more efficient street lighting program under the Climate Change Fund already supports opportunities in public lighting.

For example, before the widespread uptake of efficient commercial lighting under the ESS, stakeholders identified standards for measuring the performance of LED lighting as a key step to gaining the confidence to use the technology (Common Capital 2017, p. 80). Even now that LED lighting is widespread, ESS approval is used by brand managers as a de facto certification of quality (Common Capital 2017, p.100).

By encouraging the development of new standards and expanding the calculation methods available, the NSW Government can assist industry to develop these emerging opportunities and enable widespread take-up across the market.

Preliminary analysis

The Department has conducted a preliminary analysis of an increase to the ESS target in line with NSW Treasury's guidelines for CBA (NSW Treasury 2015, 2017). Table 3 summarises the results.

Table 3 Summary of costs and benefits of increasing the target to 13% in 2030 relative to the existing scheme settings

Present value of incremental costs and benefits to 2030	
Scheme costs	
Government costs ($m)	$14
Regulatory costs ($m)	$680
Total costs ($m)	**$694**
Scheme benefits	
Reduced wholesale purchase costs ($m)	$1,585
Avoided network investment ($m)	$155
Avoided cost of greenhouse gas emissions ($m)	$67
Avoided health cost of air pollution ($m)	$18
Total benefits ($m)	**$1,825**
Net economic benefit ($m)	**$1,131**
Benefit–cost ratio	**2.6**

Stakeholder feedback is invited on key assumptions, which are set out in Appendix B. Further modelling will inform the rate of target increase and the decision on whether to include cleaner fuels (see section discussion below).

Consultation questions

12. What issues should the NSW Government consider when setting targets to 2030? At what rate should the targets be increased to reach 13% by 2030?
13. What are the most promising opportunities once commercial lighting reaches market maturity? What is the likely size and cost of these opportunities?
14. What would prevent the uptake of new opportunities? What support (including new standards and calculation methods) does industry need to transition to new opportunities?
15. What additional data sources are available that could inform assessment of the size and cost of the energy efficiency opportunity in New South Wales? Refer to Appendix B for technical assumptions.

16. What feedback can you provide to improve the other modelling assumptions set out in Appendix B?

Penalty rates and exemptions

Penalty rates

The penalty rate was set in 2009 when the scheme was established and is based on economic modelling carried out at the time. The Independent Pricing and Regulatory Tribunal (IPART) adjusts the rate annually to account for increases in the Consumer Price Index (CPI).

As shown in the Draft Statutory Review Report, the Energy Savings Certificates (ESC) spot price has remained below the tax effective penalty rate[9] and scheme participants have mostly complied with their energy savings obligations. These trends indicate the current penalty rate encourages retailers to buy and surrender certificates and provides an effective ceiling for certificate prices. The NSW Government is not proposing to change the penalty rate.

Exemptions

The ESS provides partial or full exemptions for emissions intensive, trade exposed industries. Exemptions aim to ensure New South Wales' competitiveness relative to overseas industries not subject to similar schemes or requirements.

Small electricity retailers may face disproportionately high administrative costs of establishing and running scheme compliance systems. As an example, the Victorian Energy Upgrade Program applies to retailers only if they have 5000 or more customers, purchase 30,000 MWh or more from the NEM or purchase 350,000 gigajoules or more of gas.[10]

When setting this threshold, the Victorian Government stated its intention was to avoid inhibiting small energy retailers from entering the market (Victorian Government 2008, p.97). The NSW Government could expand exemptions to retailers below a certain size.

Consultation questions

17. Is the current penalty rate set at an appropriate level to incentivise retailers to buy and surrender certificates?
18. Should small retailers be exempt? If so, up to what size?

The NSW Government will expand fuel switching activities

The NSW Electricity Strategy signalled the NSW Government's intention for the Safeguard to cover a wider range of activities that reduce demand on electricity and gas networks. This could include switching from natural gas to biogas or clean hydrogen. Currently, the only eligible fuel switching activities under the ESS are between electricity and gas.

[9] Civil penalties are not tax deductible and if the scheme participants operate at a net profit, they would pay the penalty using their post-tax income. The base penalty rate would therefore be grossed up by the corporate tax rate of 30% to represent the amount of income the scheme participants would need to earn to pay the penalty.

[10] See definition of 'relevant entity' under section 3 of the *Victorian Energy Efficiency Target Act 2007*

In line with the Government's aspirations to achieve net zero emissions by 2050, the Safeguard could also include switching from other high-emission fuels. An example of this is switching from on-site diesel to alternative energy systems.

By expanding the eligible activities under the Safeguard, the NSW Government aims to:

- improve energy affordability and reliability for households and businesses
- improve consumer choice and access to energy saving technologies and fuel switching
- help drive innovation to develop the circular economy and new business models for alternative energy sources
- make emissions abatement available at low cost.

Options

The NSW Government has identified the following options for cleaner fuel switching.

Option 1. **Include switching grid connected energy to cleaner fuels:** eligible activities would be expanded to include fuel switching activities that displace grid connected electricity or gas.

To align with the NSW Government's net zero aspirations and contribute additional emissions savings towards this target, only low emissions activities such as bioenergy, clean hydrogen or solar thermal would be eligible.

Option 2. **Include cleaner fuel switching beyond grid connected energy:** eligible activities would be expanded to include fuel switching activities for both grid connected and non-grid connected energy. For example, on-site use of diesel on farms and factories could be replaced with cleaner fuels.

Case for including cleaner fuels

New South Wales has significant opportunities to switch to cleaner fuels

Bioenergy and solar thermal solutions can replace significant amounts of natural and liquified petroleum gas (LPG) in industrial use across Australia (IT Power 2015). For example, in process heating, bioenergy could replace or supplement between 750 GWh and 1390 GWh of the natural gas and LPG used each year. Much of this potential is in regional New South Wales (Energetics 2018, p. iii-iv).

The National Hydrogen Strategy and CSIRO's National Hydrogen Roadmap both identify hydrogen's potential as an alternative to natural gas for heating applications and on-site electricity generation in turbines. As these technologies become commercially viable, the Safeguard could support their take-up. This would reduce pressure on the natural gas supply chain, while reducing emissions and helping grow the hydrogen industry.

Cleaner fuels could also replace on-site use of diesel (NSW Farmers 2018). For example, upgrading an agricultural irrigation system to an off-grid solar–diesel hybrid power plant could reduce its diesel consumption by more than 60%, saving the owner over $45,000 a year. These systems are also typically more water efficient, allowing farms to reduce their water use (AgInnovators n.d.).

Switching from gas may improve affordability in the long term but there are barriers to uptake

AEMO forecasts wholesale gas prices will rise by almost 30% between 2018 and 2032, influenced primarily by international liquid natural gas (LNG) prices (AEMO 2019b; Core Energy 2019). Switching from gas to an alternative cost-effective fuel could protect users from these price increases and reduce their exposure to price volatility risk.

However, switching to cleaner fuels faces similar barriers to conventional energy efficiency. These include lack of knowledge and experience, competition for or lack of access to internal capital and operational risks associated with using novel technologies (ClimateWorks Australia 2017, p. 12). As noted in the Draft Statutory Review Report, schemes such as the ESS have proven to be successful at overcoming market barriers and encouraging the take-up of energy efficiency activities that might otherwise go unrealised.[11]

Similar schemes cover switching to cleaner fuel

The Victorian Energy Upgrades program offers incentives for a broad range of renewable heat options for both households and businesses, including solar and heat-pump water heaters (Victorian Government 2018).

Internationally, white certificate schemes like the ESS reward the onsite generation and use of renewable energy. For example, an Italian scheme provides incentives for biomass-based heat generation, solar thermal water heating, geothermal energy generation and other renewable energy generation methods (Ministry of Economic Development 2014). Denmark's Energy Efficiency Obligation Scheme incentivises solar heating systems and heat pumps to reduce gas consumption (Ecofys 2018).

Small-scale Renewable Energy Scheme incentives for solar and heat-pump water heating are declining

Solar hot water systems and air source heat pumps provide highly efficient alternatives to conventional water heaters. They currently receive incentives from the Small-scale Renewable Energy Scheme (SRES) under the Australian Government's Renewable Energy Target (RET), but these will decline over the next decade (Clean Energy Regulator 2017).

The upfront cost and payback periods for small-scale renewable technologies remain relatively high (George Wilkenfeld and Associates 2019). A decreasing incentive from the SRES is likely to reduce their take-up.

The Safeguard could substitute for the decreasing incentives from the SRES and continue to drive their uptake. This would help improve energy affordability while reducing pressure on the electricity system.

The principal objective of the ESS is to create a financial incentive to reduce the consumption of energy by encouraging energy saving activities.[12] The primary objectives of SRES are to encourage renewable energy generation and reduce greenhouse gas emissions.[13] The two schemes can therefore co-exist and reward the same technologies.

Preliminary analysis for the Department indicates solar and heat pump water heating in New South Wales could save 6500 GWh of electricity and 1.8 PJ of gas each year in the near term.[14]

[11] See analysis for Objective 1 in the Draft Statutory Review Report

[12] NSW *Electricity Supply Act 1995*, section 98

[13] Commonwealth *Renewable Energy (Electricity) Act 2000,* section 3

[14] Analysis undertaken by the Department using Jacobs (2019).

Key issues for including cleaner fuels

Updating the certificate conversion factors

The ESS uses certificate conversion factors to calculate ESCs for fuel switching activities between electricity and gas. The certificate conversion factor for gas is based on the primary energy content of natural gas (NSW Government 2015a, p.23). This means no ESCs are generated by switching from non-renewable gas to renewable gas. Currently there are no certificate conversion factors for other fuels such as diesel.

To encourage switching to cleaner fuels, the scheme could have a unique conversion factor for each fuel type, with cleaner fuels assigned lower certificate conversion factors. This would generate more ESCs, and therefore a larger financial incentive, for switching to cleaner fuels than for switching to non-renewable fuels. An example of differentiating between renewable and non-renewable fuels can be found in energy performance ratings for buildings in Europe. The European Standard differentiates renewable and non-renewable energy options through a 'primary energy factor' and a 'non-renewable primary energy factor'.[15]

Extending scheme liability beyond the electricity sector

Liable acquisitions under the ESS only include electricity sales. This means other parties such as gas retailers do not need to surrender ESCs. In 2015, the NSW Government added gas efficiency and fuel switching to the scheme without extending liability to gas because (NSW Government 2015a, p.17):

- NSW energy users that represent around 80% of primary energy use, use electricity for at least 70% of their primary energy needs. Therefore, most gas users would still contribute to the ESS from the majority of their energy use and the potential cross-subsidy is modest.
- The subsectors of the economy that rely on gas for most of their needs typically use it as a chemical input or in gas-fired power plants. As a result, these subsectors are more likely to have limited opportunities for gas savings and the potential for a cross-subsidy is minimal.

If the scale of non-electricity activities grows significantly, the NSW Government may need to consider extending scheme liability beyond the electricity sector.

Complementing the Small-scale Renewable Energy Scheme

If solar and heat-pump water heaters are included under the Safeguard, the NSW Government will need to consider how it would complement the SRES. This includes determining how incentives would be provided under both schemes and how the Safeguard could encourage additional uptake.

One option could be to set a ramp rate on deeming periods under the Safeguard to offset the SRES's deeming period decline. Systems installed on or before 31 December 2021 receive the maximum 10-year deeming period for certificate calculation under the SRES. This deeming period declines by one year each year to 2030 (Clean Energy Regulator 2017). Deeming under the Safeguard could start in 2022 and increase to 10 years by 2031.

Alternatively, the Safeguard could align with the Victorian Energy Upgrades (VEU) program, which aims to increase uptake in the replacement market. The VEU program provides incentives only for solar and heat-pump water heaters that replace existing electric hot water systems (Essential Services Commission 2019). These incentives are in addition to those under the SRES.

[15] European Standard EN 15603:2008. *Energy performance of buildings. Overall energy use and definition of energy ratings*

Consultation questions

19. Which cleaner fuel switching activities should the scheme provide incentives for?
20. Should the scheme cover technologies that are being wound down under the SRES? If so, what is the best way to do this?
21. How should energy savings be counted for these cleaner fuel switching activities?
22. What would be the likely scale of uptake of cleaner fuel switching activities? Please consider the number, size, and cost of projects.
23. Under what circumstances should the NSW Government consider extending scheme liability beyond the electricity sector?

2.2: Peak demand reduction

The NSW Electricity Strategy outlined the NSW Government's plan to introduce a certificate scheme for the deployment of peak demand reduction technologies. This part of the consultation paper considers key design elements for the new scheme.

The purpose of a peak demand reduction scheme

The electricity system has become more dynamic

Demand is becoming increasingly variable because of rooftop solar and other types of distributed supply and storage. Traditional consumers are becoming suppliers as businesses and households change how they manage energy. This evolution of the electricity network from a one-way grid to a two-way grid has created local network challenges that need to be managed.

Large-scale supply of electricity is also changing. Existing power stations are reaching the end of their technical lives and pose increasing reliability risks. Heatwaves and bushfires also pose a risk to existing transmission and distribution systems.

The NSW Government prefers for the market to lead

In response to the changing electricity system, the NSW Government has increased its focus on balancing supply and demand.

Part 1 of this paper introduces the NSW Government's EST. The EST seeks to avoid the long-term risk of an electricity emergency arising from a shortfall in firm capacity. It will do so by giving the market certainty about how much new investment is needed to satisfy the NSW Government's expectations for energy system reliability.

As set out in the NSW Electricity Strategy, the EST can be met by reducing demand, increasing supply, or both. This may include increasing electricity generation, imports from other NEM regions and demand side response.

The NSW Government will create a market-based peak demand reduction scheme

Consumers using peak demand reduction technologies will have greater choice to manage their electricity bills while helping to reduce pressure on the grid. Today, market barriers such as split incentives and access to capital hinder their uptake.

The NSW Government will establish a certificate scheme to reward the deployment of dependable peak demand reduction capacity. Like the ESS, the scheme will place a peak demand reduction obligation on liable parties.

By requiring liable parties to purchase and surrender peak demand reduction certificates the scheme will reward dependable peak demand reduction capacity. This could include technologies ranging from small-scale residential appliances through to large scale commercial and industrial systems.

By creating a peak demand reduction scheme, the NSW Government aims to:

- put downward pressure on retail prices by reducing electricity market volatility
- maintain electricity supply reliability and reduce the likelihood of planned and unplanned electricity system outages
- reduce the need for and cost of additional electricity supply infrastructure, which would flow through to reduce network prices
- create a competitive market to offer peak demand reduction products and services
- stimulate innovation in technology and business models
- provide government with low-cost tools to respond to significant peak events, if they are forecast to occur
- support consumers to lower their energy bills by adopting peak demand reduction technologies.

By supporting technologies that can reduce demand during peak periods, the scheme will reduce wholesale prices and avoid potential supply shortfalls. By helping better match supply and demand, the scheme will help manage the transition to a modern energy system. It will also provide a tool for responding to forecast breaches of the EST.

All consumers in New South Wales will benefit from downward pressure on wholesale prices and savings from deferred energy infrastructure. Preliminary modelling indicates that the Safeguard, including the peak demand scheme, could save an average household $15.50 per year on electricity bills.

Before setting targets for the scheme, the Government will model the demand reduction needed as well as the size and cost of the opportunity.

Box 1 provides examples of successful market-led programs that provide incentives for peak demand reduction activities.

Box 1 Examples of programs that support peak demand reduction capacity

United States

In the United States, programs that incentivise the rollout of demand response technologies and facilitate their use as flexible solutions to actively manage the grid are common[16]. Most utilities offer their commercial and industrial customers a demand response option and the seven independent system operators/regional transmission organizations (ISO/RTOs) also sponsor demand response programs (Office of Energy Efficiency and Renewable Energy n.d. a).

In California, Pacific Gas and Electric provides free technical assistance and incentives to customers for installing automated demand response equipment. This equipment uses communication and control technology to automatically implement the customer's chosen pre-programmed load reductions, providing a fast and reliable way to respond to peak events, while still leaving the customer in complete control.

The incentive is US$200/kW (up to 75% of total equipment and installation costs) for automated load reductions. Eligible equipment includes energy management systems and software, wired and wireless controls for lighting, HVAC, thermostats, motors, pumps and other equipment capable of receiving curtailment signals (Office of Energy Efficiency and Renewable Energy n.d. b).

[16] For a list of demand response and time-variable programs in the United States, visit the Federal Energy Management Program webpage.

Queensland

Energex and Ergon Energy Network, Queensland's state-owned distribution network service providers (DNSPs) provide incentives for households and businesses to reduce peak demand. Customers and stakeholders support this program as a market-driven solution (Energy Queensland 2019).

Businesses located in priority areas can receive cashback incentives for reducing peak demand. Eligible technologies include energy efficient lighting, motors, refrigeration and building management systems.

Cashback incentives are available to households that connect electric hot water systems, pool pumps and other appliances to load control tariffs. Cashback incentives are also available for demand response enabled air conditioners. On days of extreme demand, these air conditioners can be signalled by the network operator to reduce their energy consumption.

Energex and Ergon Energy's demand management programs collectively provide 874 MW of demand reduction that can be called upon during extreme periods (Energy Queensland 2019).

In February 2018, South East Queensland experienced heatwave conditions for five days. Demand response was implemented by Energex during this period by signalling PeakSmart air conditioners to cap their energy consumption to 50%, reducing demand on the network, while enabling customers to stay cool. When surveyed the following week, 77% of participants reported not noticing any change in their air conditioner (Energy Queensland 2018).

Measuring peak demand reduction

This section considers how best to answer the question, 'for what is a certificate issued'.

Peak demand events have both a capacity and duration dimension. They are likely to take place under certain circumstances and can occur over sequential days. The certificate unit for targets and activities will need to capture these aspects.

An individual activity can contribute to reducing demand during a peak event even if it only does so for a shorter period. To allow certificates to be traded, there must be a standard unit that allows them to be aggregated.

Dimensions of the certificate include the following.

- **Capacity**: The standard unit for measuring capacity and demand is either kW or MW.
- **Timing**: Maximum demand is correlated with temperature, month of year, day of week and time of day (AEMO 2019d).

  The scheme's rules will need to state the conditions when capacity should be available as simply as possible, while also providing certificate providers with enough certainty. There are several different approaches for achieving this. For each approach, a different actor bears the financial risk of buying replacement capacity if the contracted amount is not made available when needed.
- **Temperature extremes** correlate highly with maximum demand and high wholesale prices, but may not provide sufficient certainty for contracting[17] with customers to make capacity available. The certificate provider would bear the risk that capacity is not made available when needed.

[17] Contracts with customers will be necessary for peak demand response and shifting as discussed in 'Eligible peak demand reduction activities' below. They would not be necessary for peak demand saving activities.

- **Months, days and times** (e.g. between 4.30pm and 6.30pm on summer weekdays) may provide greater certainty for contracting. However, this approach may miss some peak or high wholesale price events that occur outside these times. The electricity market would bear the risk that capacity is not made available when needed.

  Requiring capacity to be available when **wholesale prices are higher than a threshold** may be more effective. As customers do not generally see wholesale prices, certificate providers would need to simplify this condition into contracts to which customers could provide informed consent. Depending on the contract, the customer or the certificate provider would bear the risk that capacity is not made available when needed.

- **Duration**: Projected capacity shortfalls may last for several hours. The same is true of the period during which peak demand reduction may reduce high wholesale prices. The certificate units for targets and activities will need to consider this duration. To do this, the combined effect of all activities (including activities which provide short periods of peak demand reduction) will need to be aggregated. Hence, the certificate unit will allow capacity to be counted, even if only available for short periods.
- **Availability factor**: Some capacity may always be available when needed (e.g. a load that has been shifted to late at night). Other types of capacity may be available less frequently (e.g. an industrial process that has a summer shutdown or can only be interrupted once every second or third day). This means the certificate unit will need to discount for capacity that is not always available when needed.

A certificate unit could be defined as:

> 1 certificate = capacity (kW or MW) available for a defined period (e.g. 30 minutes) and at specified times or under specified conditions multiplied by the availability factor,
>
> where availability factor = the ratio of the number of days that the capacity is available during the specified time, divided by the total days in the specified time.

While this possible definition of a certificate unit includes both capacity and time, it is not an energy unit because the available capacity may neither save nor discharge energy if not needed.

A peak demand reduction scheme certificate could be abbreviated to PERC for **Pe**ak **R**eduction **C**ertificate.

Consultation questions

24. How can the scheme's certificates best capture capacity, timing, duration and availability factor?
25. Who is best placed to manage the financial risk that capacity is not made available when needed?

Eligible peak demand reduction activities

This section will discuss the types of activities that may be eligible for incentives under the scheme.

Defining eligible activities

Many activities reduce demand at peak times. Competition among these will deliver the most efficient outcome.

1. Peak demand savings

Some appliances and equipment use more energy during the peak than at other times. Examples of this include refrigeration and air conditioning, as they work harder when it is hot. Efficient versions of these also save more energy during peak than at other times. Some other efficiency activities may also reduce peak demand because they are certain to use energy at peak times or, like insulation, they have an indirect impact on air conditioning.

Peak demand savings do not cause a loss of service for the end-user and can be relied on as long as the technology is in place.

The ESS does not recognise the full value of energy savings at peak times because it values all energy savings equally. The peak demand scheme could recognise the additional peak benefit of these technologies, above and beyond the year-round energy savings rewarded by the ESS. Rules and methods will be set to ensure incentives from the two schemes do not duplicate each other.

2. Peak demand response

Some appliances and equipment can be controlled to temporarily reduce operating load at peak times. This results in a lower level of service (for example on a hot day) or output which is not recouped later.

In the residential sector air conditioners will have demand response capabilities as mandated under the E3 program (see Box 2 and p 29 for discussion of consumer protection issues). The commercial and industrial sectors have opportunities to temporarily reduce operating load of equipment such as air conditioning systems and refrigeration systems. Other opportunities under this activity category include large-scale behaviour-based programs.

One way to do this is to have both the technology installed and a contract or agreement to activate the technology in place. Using the demand response capability requires the end-user to agree that a service provider may activate it. The demand response capacity can only be relied on for the length of the contract.

3. Peak demand shifting

Some appliances and equipment can be routinely changed to shift energy use away from peak periods to other times. Examples include hot water systems, pool pumps and electric vehicles.[18] Others, such as batteries, can reduce peak demand by charging in off-peak times and discharging during peak times.

Like peak demand response technologies, peak demand shifting activities will only contribute to capacity if there is a contract in place. To avoid a reduction in service, appliance usage patterns

[18] Demand control capabilities for electric vehicle chargers, hot water systems and pool pumps will be mandated under the Equipment Energy Efficiency (E3) program (more details in Box 3).

need to be compatible with the required demand shifting (e.g. charging an electric vehicle before or after the peak period).

Box 2 Examples of peak demand response projects

Example 1 – Residential peak demand savings

John wants to buy a fridge. The salesperson tells him energy efficient models come with a discount. This is because the peak demand savings provided by the more efficient appliance are now rewarded under the peak demand reduction scheme. Combined with incentives already available under the ESS, the price is now attractive enough to make John buy the more efficient fridge.

Example 2 – Industrial peak demand response

Tina is the facilities manager for a timber mill and is looking for ways to reduce the mill's energy bill. She contacts an energy service company to get a professional assessment of the site and advice on what energy savings options are available.

Xiaofeng, an engineer at the service company, inspects the site and finds some of the machinery can be quickly switched on and off if upgraded with a control system. Tina can get this system at a discount, because it provides demand response capacity and is rewarded under the peak demand scheme. She may also receive a regular payment for maintaining the contract with the service provider.

Xiaofeng explains to Tina that with the new system, her service provider can give her cash incentives for reducing the mill's consumption during peak events. This is because they can bid Tina's capacity into the wholesale electricity market when prices are high.

The certain upfront payments together with anticipated but uncertain cash incentives outweigh the lost production from the times when the mill provides demand response.

Example 3 – Peak demand shifting (pool pumps)

Raj wants to buy a new pool pump. The salesperson tells Raj he can keep his electricity bill down if he signs a contract with a service provider who programs the pump not to run at peak times each day. The pump can also stay turned off for longer in extreme conditions. This is because new pool pumps are now demand response enabled and can be turned on and off remotely.

Three months later, on a hot summer day, the service provider turns off the pool pump for longer than usual. The water quality in Raj's pool is not affected as the pool pump is turned back on again once its demand response capacity is no longer needed.

Raj is providing demand response capacity, so he receives an upfront incentive under the peak demand scheme for entering the contract. If his pool pump is more energy efficient than the market average, he could also receive a benefit from the ESS.

Example 4 – Peak demand shifting (batteries)

Two years ago, Veronica decided not to install a battery system with her solar panels because the upfront costs were too high for her. She notices that battery prices have since gone down, and a new system could now be affordable.

She enquires with a salesperson, who tells her they are discounting batteries as they are eligible for financial incentives under the new peak demand reduction scheme. This is because batteries are charged by solar panels during the day and can be controlled to discharge during peak times. Veronica buys the battery and signs a contract to make her demand response capacity available.

Ensuring complementarity with other programs

This section sets out how the peak demand reduction scheme can complement existing and proposed national programs addressing peak demand (see Box 3 for details on these).

In principle, the peak demand reduction scheme will pay for capacity. Where a demand response standard is in place, the scheme will reward the ongoing contract to ensure the capacity is available. Where a minimum standard is not mandated, the scheme can also contribute towards the capital cost. Other mechanisms will pay when demand response is used or the stored capacity is discharged.

Demand response under the National Electricity Market

Under the NEM, service providers in most cases receive payments when wholesale prices are high, or AEMO signals lack of reserve in the network.

Irregular payments in response to peak events alone may not be enough to incentivise deployment of significant demand response capacity. Demand response capacity obligations are a complementary mechanism providing reasonably certain payments based on available capacity. Internationally, capacity-based programs have achieved high rates of participation (Brattle Group 2015, p.47).

By creating a capacity-based certificate scheme for peak demand reduction, the NSW Government will complement existing and future price-based initiatives in the NEM. Detailed design will define eligibility rules to ensure non-duplication of incentives.

The NEM also includes network demand response programs for projects that address network constraints. The New South Wales scheme could work with these programs, subject to eligibility requirements to ensure non-duplication.

Energy storage systems under the NEM

The rules governing energy storage systems are complex. The New South Wales scheme will not duplicate incentives from the NEM that have a peak demand reduction element. This may include having a cap on the maximum nameplate rating of these systems. The Department will develop detailed rules and methods for energy storage systems in consultation with stakeholders.

Equipment Energy Efficiency (E3) program

Under the Australia-wide E3 program, by 2025 air conditioners, electric storage water heaters, pool pumps and electric vehicle chargers/dischargers will need to meet demand response capability requirements.

The new standard will drive the rollout of these products but does not guarantee they will be activated and controlled to achieve peak demand reduction. Consumers will decide if they wish to contract with a demand response service provider (DRSP) in return for monetary, tariff or other benefits.

There are costs associated with the activation and administration of the demand response capacity contracts. The NSW scheme can complement the E3 program by rewarding the ongoing and continued availability of the demand response capability. Incentives for the activation of the capacity could come from demand response initiatives under the NEM.

Before the E3 standard is rolled out, the NSW peak demand response scheme can provide additional support for consumers to choose a demand response enabled appliance.

Box 3 Existing and proposed national programs and mechanisms

Demand response under the NEM

The NEM employs four types of demand response: wholesale, emergency, network and ancillary services. The equipment providing demand response is often the same, but the services provided are distinct (AEMC 2019a, p.i).

Wholesale demand response reduces the quantity of electricity bought in the wholesale market. In the short term, it can help address a tight supply–demand balance and in the long term it can reduce the need for peaking capacity.

The Australian Energy Market Commission (AEMC) is considering a mechanism for wholesale demand response in the NEM. If adopted, consumers would be rewarded for choosing to turn down or turn off their electricity at peak times. DRSPs could sell these demand reductions as a supply-side resource into the wholesale market.

AEMC has limited the mechanism to large energy users as consumer protection reforms are needed for small customers (AEMC 2019a, p.v). AEMC will make its final determination on this mechanism in June 2020 (AEMC 2019d).

Emergency demand response is employed by AEMO during supply emergencies and is centrally dispatched or controlled to avoid involuntary load shedding (AEMC 2018, p.5).

Under the Reliability and Emergency Reserve Trader (RERT), aggregators can sell reserve capacity to AEMO at times of projected supply shortages in the NEM. The reserves can come from either curtailed customer loads or generation capacity not otherwise available to the market.

RERT prices are typically high. AEMO triggered the RERT in New South Wales on 4 January 2020 due to the impact of the bushfires on the electricity system (AEMO 2020c), paying an estimated $7.3 million for 232 MWh of reserve (AEMO 2020d).

Network demand response aims to reduce the need for network investment by providing alternative, least-cost options.

The Australian Energy Regulator (AER) funds two network demand management programs for DNSPs (AEMC 2018, p.5):

- an incentive scheme, which promotes efficient network investment by incentivising alternatives such as demand management or location generation
- an innovation allowance, which provides funding for research on demand management initiatives and for sharing these learnings across industry and consumers.

AEMC recently announced demand management incentive mechanisms for the transmission network (AEMC 2019b).

Ancillary service demand response is employed by AEMO in response to brief and unexpected imbalances in supply and demand, for example by participating in the frequency control ancillary service (FCAS) markets.

Energy storage systems under the NEM

Energy storage systems such as batteries are not currently defined in the National Electricity Rules. Under AEMO's interim arrangements, energy storage systems are treated as two separate components, as both a load and a generating unit.

In general, eligible systems can participate in the NEM by offering energy as generating units, buying energy as loads, or providing frequency control and ancillary services (AEMO 2019c).

AEMC is considering a rule change request by AEMO on energy storage systems, which may have implications for the participation of storage systems in the electricity wholesale market (AEMO 2019c).

E3 program – Smart demand response capabilities for selected appliances

In November 2019, the COAG Energy Council agreed to introduce demand response capability requirements in national standards for four technologies (DEE 2019):

- air conditioners
- electric storage water heaters
- devices controlling swimming pool pump units
- electric vehicle charger/discharger controllers.

Currently, neither appliance manufacturers nor DRSPs are willing to risk investing in any particular demand response technology because of the fragmentation of the market (DEE 2019). The new standard aims to overcome this fragmentation and provide the scale necessary for DRSPs to aggregate large numbers of consumers and appliances from different manufacturers (DEE 2019, p.2).

Consumer protections

The peak demand reduction scheme will provide benefits to all electricity customers in NSW, particularly those who directly receive products and services under the scheme.

As the scheme will create a market for new and emerging products and services, existing consumer protection frameworks may need to be reviewed to ensure that consumer rights are protected.

The AEMC has commenced a review on consumer protections in the energy market, given the changes in energy technology and regulations (AEMC 2019c). The review established the following consumer protection principles. The NSW Government proposes to adopt these principles to guide the development and implementation of the scheme.

Consumers are well-informed. Service providers must provide detailed information on the products and service they provide that is easy to access and understand. This includes impacts on service levels. Any consumer participation must be based on informed consent.

Products and services are safe and fit for purpose. All products and services must meet relevant safety and performance standards. Service providers must obtain relevant qualifications. Service providers should not offer products or services to consumers that are not fit for purpose.

Products meet the needs of vulnerable and disadvantaged consumers. Consumers that need uninterrupted energy services will not experience any reduction in service levels.

Prevent practices that are unfair and contrary to good faith. Service providers will not be able to lock consumers in to unreasonable contracts. Service providers will be required to offer cooling off periods to consumer, which will allow them to consider impacts on service levels.

Provide accessible and timely complaint resolution. Service providers should provide guidance on complaint resolution processes and be the first point of contact for complaints.

Promote proportionate, risk-based enforcement. The NSW Government will take compliance and enforcement action when required. This will be further discussed in Part 2.3 of this paper.

Calculating reduction in peak demand

Under the ESS Rule, energy savers can use a range of methods for calculating energy savings across many different activities.

The most popular of these has been the Deemed Energy Savings Method which allows certificates for future energy savings arising from energy saving activities (such as replacement of lighting products), typically over seven to 10 years.

Certificates can also be created from measured and verified energy savings using either the Metered Baseline Method (calculating whole-site energy savings) or the Project Impact Assessment with Measurement and Verification Method (calculating both whole-site and equipment level energy savings).[19]

The peak demand reduction scheme will adopt a similar approach by providing a range of methods. Each calculation method will cover the following elements.

- What is the peak demand reduction activity? How does it reduce peak demand?
- Are credits calculated upfront?
- How much peak demand can this activity reduce? How can the demand reductions be measured?
- What is the duration of the peak demand reduction activity within a peak event?
- How frequently is the demand reduction activity available?
- What is the lifetime of the demand reduction activity?
- How does this activity meet relevant regulations and standards on health, safety and performance?
- How can consumer rights be protected?

Recognising location-based peak savings

Under the ESS, energy saving activities in regional areas receive more certificates. This is because the regional network has a higher network loss factor (NSW Government 2015a, p.19).

Peak events that are caused by network constraints may only occur at the local network level. Peak demand reduction in these areas is of greater value than in areas where there is spare network capacity.

The scheme could include location-based multipliers or activities that are specific to certain locations. This would require collaboration with network service providers, so these areas can be identified and valued.

Consultation questions

26. Are there other activities the NSW Government should consider for inclusion in the peak demand reduction scheme?
27. What is the size and cost of the peak demand reduction opportunity available in New South Wales?
28. Are there alternative ways in which the peak demand scheme could complement national schemes?
29. What are the key issues, and potential mitigation measures, the NSW Government should consider on consumer protection?
30. Which calculation methods should be developed first?

[19] For more information on these calculation methods, visit IPART's Easy Savings Calculation Methods webpage.

31. Should location-based multipliers or activities that are specific to certain locations be considered?

Establishing liability for the scheme

Building on the success of the ESS, the new peak demand reduction scheme will require liable parties to surrender certificates to meet target obligations. The scheme may include exemptions for certain groups and impose penalties on liable parties that do not meet their obligations. The following sections explore these aspects of scheme design in more detail.

Defining who is liable

The ESS covers energy savings in both the electricity and gas sectors. Given the benefits of the proposed peak demand reduction scheme relate mostly to the electricity sector, the peak demand reduction scheme will cover the electricity sector only.

Under the ESS, all electricity retailers, certain generators (those who supply directly to customers in New South Wales) and large energy users (those who purchase electricity directly from the NEM) are required to meet energy savings targets.

Compared to other parties, these parties will benefit from lower wholesale energy costs under the scheme. In addition, they already have administration and compliance arrangements established under the ESS, so would incur lower additional administration costs.

Therefore, the NSW Government proposes that the liable parties under the ESS become liable under the peak demand reduction scheme.

Should there be exemptions?

Both the ESS and the Commonwealth Government's Renewable Energy Target (RET) provide partial or full exemptions for emissions intensive, trade exposed industries. The NSW Government proposes to extend the same exemptions under the peak demand reduction scheme.

Part 2.1 of this paper discussed the rationale for a possible exemption of small liable parties. This could also apply to the peak demand reduction scheme.

Allocating the target

Under the ESS, liability is based on electricity purchases and supply of electricity generated by a scheme participant (known as liable acquisition).[20]

The NSW Government has identified two options for the peak demand reduction scheme.

Option 1. **Liability is based on system-wide peak demand less exemptions.** This option requires the Government to establish a simple, transparent way to determine system-wide peak demand. The method would need to be based on existing data collected by energy market bodies.

Option 2. **Liability is based on total liable electricity purchases less exemptions (preferred option).** This option uses the same approach as the ESS. It could be less complex to set up but may be less equitable. Some liable parties may purchase a lot of electricity outside of peak periods, and therefore their electricity purchases may not be proportional to their contribution to system-wide peak demand.

[20] NSW *Electricity Supply Act 1995*, section 107

Determining individual targets

The NSW Government has identified the following options for determining the targets for each liable party.

Option 1. **Target by number of certificates.** Under this option, the scheme would have a fixed target each year, by total number of certificates. The target would be divided among liable parties based on their contribution to liable activities. This is similar to the Large-scale RET and the Victorian Energy Upgrades program.

Option 2. **Target by proportion of contribution to the liable activities (preferred option).** Under this option, liable parties would be required to surrender certificates that are equivalent to a fixed proportion of their contribution to liable activities (e.g. electricity purchase or peak demand contribution) each compliance year. This is similar to the ESS.

Option 3. **Maximum target with a ceiling price.** Under this option, the NSW Government would set a target every compliance year based on the estimated number of certificates that will be generated for that year and certificate surplus/undersupply from the previous year. This approach would be similar to the Small-scale Renewable Energy Scheme. Certificates can be traded in the open market, but a clearing house will be established to set a ceiling price for certificates. The proportion of the total number of certificates each liable party must surrender would be relative to their contribution to liable activities.

Option 1 provides the most certainty about the number of certificates that will be surrendered each year. Option 2 offers a more dynamic approach because the target can respond to increases or decreases in system-wide peak demand and each liable party's contribution to the liable activities.

Under Options 1 and 2, a target which is too high could lead to an undersupply of certificates. This could drive up the certificate price and prevent liable parties from cost-effectively meeting their target.

To mitigate this risk, the NSW Government will introduce a penalty price. Like in the ESS, the penalty price would essentially act as a cap on the certificate price. Liable parties could choose to pay the penalty price of meeting their target rather than purchasing certificates if the price is too high.

Because of the option to buy certificates from the clearing house, Option 3 provides less certainty on the actual demand reduction capacity the scheme would deliver. In contrast, this option provides more certainty on price. Experience from the SRES shows that spot prices tend towards the ceiling price; however, this way of setting a target adds to the complexity of the scheme, relative to Options 1 and 2, which allow the market to set the price.

Option 2 is preferred as it provides more certainty, and it is most similar to the ESS. Each liable party must determine their target at the end of each compliance year as they currently do under the ESS.

Setting penalties for non-compliance

The role of the penalty rate is to ensure compliance and to cap scheme costs. The NSW Government will set the penalty after considering:

- the certificate price required to ensure that enough certificates will be supplied for all liable parties to comply
- a safety valve to ensure the certificate price does not exceed the level required to deliver cost-effective demand reduction in New South Wales
- the impact on electricity prices for end-use customers.

Under the ESS, liable parties that pay the penalty are not required to 'make good' the shortfall in certificates in the subsequent period. This approach will apply in the peak demand reduction scheme as well.

As an alternative to paying penalties, the ESS allows liable parties to carry forward some of their shortfall to the subsequent compliance year. The maximum carried over amount under the ESS is 10% of the target (except for the first year when it was 20%).

If allowed under the peak scheme, carry forward could reduce the amount of dependable peak demand reduction capacity in New South Wales.

Setting the compliance year

A compliance year refers to a period for which the target is calculated, and certificates can be created. Under the ESS, a compliance year is the same as a calendar year.

For the peak demand reduction scheme, the NSW Government proposes that the compliance year be the financial year. This is because each financial year covers one whole summer period. As most peak events occur in summer, this arrangement will ensure that New South Wales has enough peak demand reduction capacity each summer. This is also consistent with the compliance year for the EST.

To reduce administration costs, the NSW Government proposes to change the compliance year for the ESS from calendar year to financial year.

Consultation questions

32. What are your views on the proposed approach to scheme liability? Please align your response with the topics above.
33. What would be the implications for the available dependable peak demand reduction capacity in New South Wales if the scheme allows carry forward?

Peak demand reduction certificates

Like the ESS, the NSW Government will establish a registry of certificates that will allow certificate creation and trading. Under the ESS, only Accredited Certificate Providers (ACPs) can create ESCs. The peak demand reduction scheme will adopt a similar arrangement.

Certificate expiration

In the ESS, ESCs do not have an expiry date and participants may choose to keep certificates to surrender in the future. There are two options for the peak demand reduction scheme.

Option 1. **Certificates will expire annually.** Certificates may only be generated towards each compliance year and be surrendered to meet obligations under that compliance year.

Under this option, for certificates created upfront, the scheme would assign each certificate to a future compliance year. Liable parties would not be able to use any unused certificates for a past compliance year in any future compliance year. For example, an eligible activity in 2022 may reduce peak demand by 2 kW for 10 years. The activity would be awarded with two certificates every year from 2022 for 10 years. These certificates could be awarded upfront in 2022, but each certificate could only be used against the compliance year it is created under.

This arrangement would ensure the required peak demand reduction target is achieved every year; however, this may increase the transaction costs and complexity of the scheme. Another disadvantage of this arrangement is that liable parties may not be willing to buy future certificates in advance, leading to cash flow constrains of certificate creators.

Option 2. **Certificates will not expire (preferred option).** This would be like the ESS and would have lower transaction costs. The disadvantage of this approach is it makes it difficult to reach a certain level of peak demand reduction for a single compliance year, as certificates may represent peak demand reduction in future years.

Option 2 is preferred as it is more flexible and will help reduce price volatility in the PERC market.

Consultation questions

34. What qualifications should certificate providers be required to have?
35. Should certificates expire every compliance year or should they be transferable to future compliance years? What implications would your preferred approach have for ensuring dependable peak demand reduction capacity in New South Wales?

Preliminary cost–benefit analysis

The Department has conducted a preliminary assessment of the peak demand reduction scheme in line with NSW Treasury's guidelines for cost–benefit analysis (CBA) (NSW Treasury 2015, 2017). Appendix B and Appendix C outline the assumptions underpinning the CBA. The Department will conduct further modelling before setting scheme parameters, including targets.

Table 4 Summary of incremental costs and benefits for the peak demand reduction scheme

Present value of costs and benefits to 2030	Peak scheme only	Peak scheme with ESS
Scheme costs		
Government costs ($m)	$32	$46
Regulatory costs ($m)	$642	$1,323
Total costs ($m)	**$674**	**$1,368**
Scheme benefits		
Reduced wholesale purchase costs ($m)	$1,435	$2,392
Avoided network investment ($m)	$313	$315
Avoided cost of greenhouse gas emissions ($m)	($41)[21]	$74
Avoided health cost of air pollution ($m)	$3	$19
Total benefits ($m)	**$1,711**	**$2,800**
Net economic benefit ($m)	**$1,037**	$1,432
Benefit–cost ratio	**2.5**	**2.0**

[21] When modelled on its own, the peak demand reduction scheme will slightly increase the greenhouse gas emissions in the electricity sector in 2028-2030. This is because the scheme will drive down the wholesale price and displace some wind and battery capacity with coal and hydro dispatch. For more information, see page 12 of Appendix C.

2.3: Scheme administration and regulation

This part of the paper considers improvements to the administration and regulation of the ESS and how they apply to the design of the peak demand reduction scheme.

The NSW Government is committed to continuous improvement of regulations to ensure their continued effectiveness and efficiency. Putting the customer at the centre of everything we do is also a NSW Government priority.

Sections 151 and 153 of the NSW *Electricity Supply Act 1995* allow the Minister to appoint any 'person or body' as the ESS Scheme Regulator and Administrator. In the absence of such an appointment, IPART undertakes these functions.

As Scheme Regulator, IPART is responsible for regulating compliance of electricity retailers and other scheme participants with the ESS. As Scheme Administrator IPART's responsibilities include:

- accreditation of ACPs and accepting products for use through the scheme
- registration of certificates and reporting on the numbers of certificates created and surrendered
- managing the compliance of ACPs and scheme participants with the ESS Rule and regulation
- conducting investigations and taking enforcement action, including the issuing of penalty notices.

The Department is responsible for the policy framework and the delivery of the ESS. The Department's functions include:

- undertaking annual updates of the ESS Rule and exemption orders
- drafting regulatory and ESS Rule amendments arising from reviews
- engaging stakeholders on rule changes, reviews and use of the scheme.

Both IPART and the Department work to improve compliance outcomes. IPART has delivered industry education and training, and the Department annual updates to the ESS Rule.

Achieving excellence in administration and regulation

The NSW Government's vision for excellence in administration and operation is for the ESS and peak demand reduction scheme to have the following elements.

Rules • for effective energy saving activities and the calculation of energy savings • which are easy to understand, transparent, accurate, minimise opportunity for non-additional savings, and prevent fraud • which can be easily updated as energy saving and peak reduction technologies change	**Administrators and regulators** • have the role of facilitating effective energy saving and peak reduction activities with minimum red-tape • have powers to ensure compliance with the rules, resolve complaints and take timely and proportional enforcement action when necessary
Scheme participants and service providers • have the capability to meet their targets without paying penalties • have the capability to deliver effective energy saving and peak reduction activities that comply with the rules	**Government** • sets service standards and key performance indicators

'Effective energy saving activities' refers to activities that comply with the rules and result in actual energy savings.

'Capability' refers to the ability of service providers to meet the compliance requirements as they apply for and document their energy saving activities.

Consultation question

36. What is working well with the administration and regulation of the ESS? What features would you want to see continuing, and potentially replicated for the peak demand reduction scheme?

Development, implementation and review of rules

Improving the rule review process could enhance simplicity

Following the 2015 review of the ESS, the NSW Government confirmed it would update the ESS Rule annually, with a major review of the ESS Rule every three years (NSW Government 2015a, Section 6.2.4).

The annual updates to the ESS Rule have been successful in updating deemed savings factors, incorporating new products and practices, and maintaining the integrity of the scheme. However, the annual rule change process has also led to multiple versions of the rule being published over a short period. This has in turn required service providers to continually update their systems and processes.

Options to improve the ESS Rule review process include:

- having systematic reviews and updates by method or topic
- faster processing of low-risk rule change requests
- structural changes to the layout of the rule to make amendments and reviews more streamlined
- exploring options to transition regulations and rules into computer codes, so that regulations are easier to interpret and comply with.

Rules and regulations for the peak demand reduction scheme should incorporate similar principles and design for simplicity from the outset.

Employing customer-centric design

Online systems created to aid compliance with regulations and rules should be customer focused, cost-effective and easy to use for government, scheme participants and service providers. Scheme participants and service providers should only need to provide key details and information once. This is in line with the Premier's Priority to increase the number of government services where citizens of New South Wales only need to 'Tell Us Once' by 2023 (NSW Government 2019a). For example, ACPs participating in both the energy savings and peak demand reduction schemes should only have to enter their company's details once.

Discovery research and co-design conducted in 2019 by the Department and other scheme stakeholders identified six key areas for investigation (NSW Government 2019b). These include:

- streamlining manual data processes by digitising and automating current manual data handling and verification processes, in order to improve data quality and reduce duplication
- integrating the ESS Portal and the ESS Registry into a single digital platform that provides verifiable, real-time information about scheme activities and created energy savings
- developing 'rules as code' to produce a complementary digital version of the ESS rules, which would:
    - support consistent development of software and systems used to calculate energy savings
    - reduce interpretation issues
    - model impacts of rule changes prior to implementation
- implementing a more transparent and collaborative rule change process by:
    - involving stakeholders more in the rule change process
    - reducing the timeframe between policy development and implementation
    - facilitating a deeper understanding of the impact of rule changes on stakeholders
- more effective measurement and verification of energy savings using real-time measurement of energy savings and simplified calculations methodologies
- bringing energy savings closer to the end-user by reducing barriers to entering the scheme, to encourage increased participation and drive behaviour change.

Each of the above could be extended or expanded to incorporate the peak demand reduction scheme.

Consultation questions

37. Should the annual Rule review and three-year major Rule review process for the ESS and new peak scheme be changed or is it working effectively? Please provide an explanation for your response.
38. Would the above ideas help make the Safeguard more customer-centric? Do you have other suggestions?

Scheme participants and service providers

Encouraging effective activities with minimal red tape

End-users of government policy initiatives often just want to know how to comply with regulations (Regulatory Policy Framework Review Panel 2017). As the Regulator and Administrator of the ESS, IPART works to ensure that scheme participants and service providers understand and comply with the ESS requirements. Activities include:

- regularly sharing feedback from stakeholders and performance information with the Department to improve the operation of the regulatory framework and administrative processes
- actively engaging stakeholders through various forums and consultation processes to help inform the development of their regulatory framework and processes
- publishing information on its processes including audit and compliance guides, a compliance and enforcement policy and the annual compliance and operation report to the Minister.

IPART uses a range of communication strategies to engage with industry and has introduced improvements to its systems and processes to increase the administrative efficiency of the ESS (IPART 2019a, Section 5).

Other ways to improve communication and develop the capability of service providers and other stakeholders to comply with the requirements of the ESS include:

- improving stakeholder consultation for the development of evidence requirements
- adding more real-world examples to ESS method guides
- introducing early lodgement of projects, including an eligibility check by IPART
- providing more education to service providers after rule changes.

The NSW Government seeks feedback on the appropriateness of the above activities and whether they will encourage effective energy saving activities.

Consultation questions

39. What improvements could be made to the administration and regulation of the ESS that would encourage the creation of effective energy saving activities? Please provide an explanation for your response, including an indication of your key priorities.
40. Who should be responsible for developing the capability of service providers to deliver effective activities, the Scheme Administrator or the Department?
41. What is the best way to develop the capabilities of service providers?

Administrators and regulators

Compliance and enforcement

Administrators and regulators should have appropriate power to ensure compliance with rules and take timely and proportional enforcement action.

The compliance and enforcement framework should be designed to minimise opportunities for non-additional savings and prevent fraud. Penalties for breaches by ACPs should be proportional to the regulatory and compliance risk.

Following the 2015 review of the ESS, the scheme's compliance and enforcement framework was enhanced by the introduction of a penalty notice regime. Penalty notices are issued by an enforcement officer and are subject to the NSW *Fines Act 1996*. This means they are an appropriate enforcement tool only for the most serious instances of non-compliance. IPART issued the first penalty notice in 2018 (IPART 2019a).

A civil penalty regime that complements or replaces the existing penalty notice regime could lead to procedurally simpler enforcement outcomes that are tailored to fit the seriousness of each non-compliance. Comparable regulators such as the Clean Energy Regulator under Part 21 of the *Carbon Credits (Carbon Farming Initiative) Act 2011* have the power to issue civil penalties.

Under a civil penalty regime:

- financial penalties set out in Schedule 4 of the Electricity Supply (General) Regulation 2014 would be expressed as a maximum amount, giving the Scheme Administrator the flexibility to impose lesser amounts depending on the circumstances
- the recipient of a civil penalty order would have the right to apply for internal review of the decision to make the order, and external review by the NSW Civil and Administrative Tribunal (NCAT)
- failure to comply with a civil penalty order would be an offence, and the Scheme Administrator would be able to recover an unpaid penalty as a debt due to the Crown.

The introduction of a civil penalty regime would expand the Scheme Administrator's enforcement toolkit. As an efficient, lower-cost enforcement tool, civil penalties may be better suited to address instances of less serious non-compliance than the alternatives currently available to IPART.

Table 5 sets out other options to enhance the ESS's compliance and enforcement framework by expanding existing powers and adding a limited number of new powers of the Scheme Administrator.

Table 5 Compliance and enforcement reform options for the current ESS

Necessary power	Potential options
The ability to hold ESCs pending the result of an audit	Amend the regulation so all existing ACPs are required to have voluntary undertakings to withhold up to 20% of ESCs pending the result of an audit
The ability to gather and share relevant evidence and information effectively	Expand IPART's investigation powers to include power to appoint authorised officers to enter premises to inspect an upgrade Clarify powers to request, publish and share compliance information
Take action against individuals responsible for non-compliance	Create a new offence to take action against both ACPs and any subcontractors for non-compliance Clarify that directors and managers of ACPs who knowingly authorise or permit the creation of false ESCs may be required to personally surrender ESCs
Managing risk of related entities' non-compliance	Explicit power to take compliance of related entities into account
Manage risk of companies entering external administration	Power to suspend or cancel an ACP's accreditation in all external administration related scenarios
Prevent serial offenders from participating in the scheme	Power to issue banning orders for a specified period
Provide certainty on timing of ESC creation	Clarify the provisions regarding the creation and registration of ESCs

Necessary power	Potential options
Have enough time to take enforcement action	Changing statute of limitations to two years after IPART becomes aware of the offence

Review and complaints resolution

The ESS allows scheme participants and accredited certificate providers to apply to NCAT for reviews of decisions by the Scheme Regulator and Administrator. Instruction on how to have a decision reviewed is available on the ESS website (IPART 2019b).

Consultation questions

42. What are your views on the options to enhance the compliance and enforcement framework of the ESS?
43. Are the current provisions for the NCAT review of decisions by the Scheme Regulator and Administrator sufficient? Please provide an explanation for your response.

Government

Monitoring, reporting and continual improvement

The NSW Government's 2016 *Guidance for regulators to implement outcomes and risk-based regulation* (DFSI 2016) outlines how an initiative's effectiveness and efficiency in practice, can be tested through a structured, consistent and transparent approach to reporting. Reporting can help regulators to:

- engage more meaningfully with stakeholders
- better align clear accountabilities with regulatory outcomes
- improve cost-effectiveness through improved resource allocation
- reduce the burden for compliance on regulated entities.

The NSW Government has previously committed to clarifying IPART's role as Scheme Administrator and Regulator of the ESS. In doing so the Government remains committed to introducing key performance indicators following the current review as they apply to schemes under the Safeguard.

Consultation questions

44. What key performance indicators and service standards should be considered for the Scheme Regulator and Administrator?
45. What else can the NSW Government do to ensure the continuous improvement of the ESS?

Appendix A – Consultation questions

The questions from throughout the consultation paper have been drawn together here for ease of reference by those wishing to make a submission. An online survey containing all the consultation questions is also available at https://energy.nsw.gov.au/government-and-regulation/consultation.

Setting an Energy Security Target (page 7)

1. Is the approach to assessing firm capacities from generators, interconnectors and demand response used to meet the EST reasonable and appropriate? Is there an alternative approach?
2. Is the approach to applying the capacity factors for wind and solar generators reasonable and appropriate?
3. Are AEMO's maximum demand forecasts appropriate for use in determining the EST? Should alternatives be considered (e.g. TransGrid's forecasts)?
4. How often should EST updates be published?

Powers to gather information (page 10)

5. Are the entities required to provide information to the EST register that are listed above suitable and adequate?
6. Is there other information that should be provided for the register beyond that listed above?
7. Are the types of projects that may contribute to meeting the EST described above suitable and adequate? How could prospective projects, beyond those identified as committed, be considered within the EST forecast for firm capacity?
8. Many market participants already have requirements to report to AEMO or other market bodies. Where do you consider there may be overlap with these existing requirements that the NSW Government could leverage to ensure industry does not need to report twice? Are there other ways the NSW Government could obtain this information?

Implementation timeframes for the Safeguard (pages 12-13)

9. What would be a reasonable commencement date for the new energy saving and peak demand reduction targets? Please provide an explanation for your response.
10. Could elements of either scheme, such as the early accreditation of certificates ahead of surrendering requirements, be brought forward? Please provide an explanation for your response.
11. What support does industry need to prepare for the introduction of the scheme? Please provide an explanation for your response.

The NSW Government will extend the ESS to 2050 and increase targets (pages 16–17)

12. What issues should the NSW Government consider when setting targets to 2030? At what rate should the targets be increased to reach 13% by 2030?
13. What are the most promising opportunities once commercial lighting reaches market maturity? What is the likely size and cost of these opportunities?
14. What would prevent the uptake of new opportunities? What support (including new standards and calculation methods) does industry need to transition to new opportunities?

15. What additional data sources are available that could inform assessment of the size and cost of the energy efficiency opportunity in New South Wales? Refer to Appendix B for technical assumptions.
16. What feedback can you provide to improve the other modelling assumptions set out in Appendix B?

Penalty rates and exemptions (page 16)

17. Is the current penalty rate set at an appropriate level to incentivise retailers to buy and surrender certificates?
18. Should small retailers be exempt? If so, up to what size?

The NSW Government will expand fuel switching activities (page 21)

19. Which cleaner fuel switching activities should the scheme provide incentives for?
20. Should the scheme cover technologies that are being wound down under the SRES? If so, what is the best way to do this?
21. How should energy savings be counted for these cleaner fuel switching activities?
22. What would be the likely scale of uptake of cleaner fuel switching activities? Please consider the number, size, and cost of projects.
23. Under what circumstances should the NSW Government consider extending scheme liability beyond the electricity sector?

The purpose of a peak demand reduction scheme (page 25)

24. How can the scheme's certificates best capture capacity, timing, duration and availability factor?
25. Who is best placed to manage the financial risk that capacity is not made available when needed?

Eligible peak demand reduction activities (pages 31–32)

26. Are there other activities the NSW Government should consider for inclusion in the peak demand reduction scheme?
27. What is the size and cost of the peak demand reduction opportunity available in New South Wales?
28. Are there alternative ways in which the peak demand scheme could complement national schemes?
29. What are the key issues, and potential mitigation measures, the NSW Government should consider on consumer protection?
30. Which calculation methods should be developed first?
31. Should location-based multipliers or activities that are specific to certain locations be considered?

Establishing liability for the scheme (page 34)

32. What are your views on the proposed approach to scheme liability? Please align your response with the topics above.

33. What would be the implications for the available dependable peak demand reduction capacity in New South Wales if the scheme allows carry forward?

Peak demand reduction certificates (page 35)

34. What qualifications should certificate providers be required to have?
35. Should certificates expire every compliance year or should they be transferable to future compliance years? What implications would your preferred approach have for ensuring dependable peak demand reduction capacity in New South Wales?

Achieving excellence in administration and regulation (page 37)

36. What is working well with the administration and regulation of the ESS? What features would you want to see continuing, and potentially replicated for the peak demand reduction scheme?

Development, implementation and review of rules (page 38)

37. Should the annual Rule review and three-year major Rule review process for the ESS and new peak scheme be changed or is it working effectively? Please provide an explanation for your response.
38. Would the above ideas help make the Safeguard more customer-centric? Do you have other suggestions?

Scheme participants and service providers (page 39)

39. What improvements could be made to the administration and regulation of the ESS that would encourage the creation of effective energy saving activities? Please provide an explanation for your response, including an indication of your key priorities.
40. Who should be responsible for developing the capability of service providers to deliver effective activities, the Scheme Administrator or the Department?
41. What is the best way to develop the capabilities of service providers?

Administrators and regulators (page 41)

42. What are your views on the options to enhance the compliance and enforcement framework of the ESS?
43. Are the current provisions for the NCAT review of decisions by the Scheme Regulator and Administrator sufficient? Please provide an explanation for your response.

Government (page 41)

44. What key performance indicators and service standards should be considered for the Scheme Regulator and Administrator?
45. What else can the NSW Government do to ensure the continuous improvement of the ESS?

Appendix B – Energy Security Safeguard modelling assumptions

This appendix provides an overview of the preliminary cost-benefit analysis (CBA) for the energy efficiency and peak demand reduction schemes. It discusses key assumptions on scheme costs and benefits, and outlines the approach to estimating the available technical energy saving and peak demand reduction opportunities.

Overview of the CBA

In line with NSW Treasury's guidelines for CBA (NSW Treasury 2015, 2017), the central test of the CBA is a net public benefit test.

Table 3 summarises the incremental costs and benefits of:

- extending and increasing the target of the ESS
- introduction of the new peak demand reduction scheme
- the combined impact of the two schemes.

The CBA is based on energy market modelling by ACIL Allen (Appendix C) on the policy impact of these changes as well as analysis by the Department.

The policy impact of the two schemes combined is not additive, as the marginal price of generation decreases as energy demand reduces. Hence the combined price impact of the two schemes is less than the individual impacts added together.

The combined scenario only takes into account peak demand reduction from the new peak demand scheme. As the ESS also reduces demand at peak times, this assumption is conservative.

Table 6 Summary of incremental costs and benefits to 2030

Present value of	ESS	Peak demand reduction scheme	Both schemes combined
Scheme costs			
Government costs ($m)	$14	$32	$46
Regulatory costs ($m)	$680	$642	$1,323
Total costs ($m)	$694	$674	$1,368
Scheme benefits			
Reduced wholesale purchase costs ($m)	$1,585	$1,435	$2,392
Avoided network investment ($m)	$155	$313	$315
Avoided cost of greenhouse gas emissions ($m)	$67	($41)	$74
Avoided health cost of air pollution ($m)	$18	$3	$19
Total benefits ($m)	**$1,825**	**$1,711**	**$2,800**
Net economic benefit ($m)	**$1,131**	**$1,037**	**$1,432**
Benefit-cost ratio	**2.6**	**2.5**	**2.0**

Key assumptions for scheme costs and benefits

The costs for New South Wales of each scheme are as follows.

- **NSW Government costs in administering and managing the scheme**
  For the ESS, this is based on IPART's cost associated with administering and regulating the scheme as well as an estimate of departmental costs associated with managing the policy framework and the delivery of the ESS. Government costs for the peak demand scheme are assumed to be similar.
- **Compliance and regulatory costs on ACPs and scheme participants as a result of their involvement in the scheme, including the cost of the certificates**
  For the ESS, this is estimated using forecast ESC prices derived from an uptake model plus surveys of administration costs for scheme participants (Sapere 2017). For the peak demand scheme, this is estimated based on costs derived from a literature review of Australian peak demand reduction programs. The Department will conduct further modelling to forecast certificate prices for the peak demand reduction scheme.

The benefits for New South Wales of each scheme are:

- avoided electricity generation purchase costs (including line losses)
- deferred investment in electricity
- avoided externalities, including the value of emissions savings and avoided health costs from air pollution.

In addition, the ESS avoids gas supply costs and defers investment in gas networks.

ACIL Allen has modelled the policy impact of higher targets under the ESS and the introduction of the peak demand reduction scheme. The modelling forecasts the impact on wholesale electricity prices and greenhouse emissions.

For the ESS, the Department provided forecast incremental energy savings resulting from higher targets and ACIL Allen estimated the impact on peak demand. For the peak demand reduction scheme, the Department estimated the peak demand reduction and ACIL Allen estimated the energy savings.

The deferred investment in the electricity network for both schemes is estimated based on the avoided peak demand (as above) and the long-run marginal cost of New South Wales distribution and transmission networks.

For the ESS, gas savings are estimated by the Department. The avoided cost of supply is based on the forecast gas wholesale price (Jacobs 2018) and the deferred investment is based on the long-run marginal cost of New South Wales gas networks.

The value of emissions savings comes from Australian Treasury (2011) and the avoided health costs of air pollution come from DPIE (2019).

Key assumptions for the ESS

Incremental energy savings from higher ESS targets

The costs and benefits of the ESS are influenced by the scale, nature and cost of the energy efficiency opportunity in NSW.

Preliminary modelling for the CBA on the incremental energy savings delivered by higher targets is estimated based on recent past performance under the scheme and operational demand forecast by AEMO (2019d).

Table 7 shows the projected incremental energy savings from indicative higher targets.

Table 7 Incremental energy savings from higher ESS targets

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scheme target %	9%	9.5%	10%	10.5%	11%	11.5%	12%	12.5%	13%
Incremental energy savings (GWh)	23	67	271	732	1,214	1,715	2,236	2,777	3,317

Estimating energy saving opportunities

The Department maintains an 'opportunity list' which identifies technically viable energy efficiency opportunities in New South Wales. The list aims to quantify all available energy saving activities accessible to consumers within New South Wales and includes over 500 activities.

For each activity, the opportunity list shows:

- the amount of energy that can be saved
- the capital cost of implementation
- the total number of typical sites in NSW where the opportunity is applicable because of:
    - appropriateness (e.g. gas connection)
    - existing market share (i.e. whether users already have the technology).

The opportunity list draws on publicly available national and state sources, consultants' internal resources and evaluation of NSW Government energy efficiency programs.

The Department is currently updating the opportunity list to better reflect current and emerging opportunities, including those for cleaner fuels. The current version of the opportunity list is available for comment at the NSW Government Consultation website.

Estimating the uptake of energy savings activities

The Department maintains an 'uptake model' to estimate of the impact of ESS at different policy settings and targets (Jacobs 2014). Based on assumed demand for ESCs under different target settings, the uptake model forecasts:

- annual uptake of specific energy efficiency opportunities (from the opportunity list) by different sectors and energy end uses
- average ESC prices required for the market to meet scheme targets
- energy, peak demand and bill savings over time from increased uptake.

The key inputs to the uptake model are:

- the opportunity list
- retail gas and electricity price forecasts by customer segment
- the willingness to pay for energy efficiency across different sectors using assumed average payback thresholds
- the maximum annual capacity of the market to take up cost-effective opportunities.

The key features of the model are discussed below.

Payback thresholds reflect consumers' willingness to pay

By overcoming market barriers to energy efficiency, the scheme's incentives lower the private costs of these opportunities. This reduces the payback period (i.e. the time it takes for a return on investment to be cost effective).

The uptake model predicts whether a consumer will take up an energy efficiency opportunity by calculating the impact of the scheme's incentives on the payback period. If the payback period reaches a specified threshold, consumers are assumed to take up the measure.

Table 8 shows the payback thresholds currently used in the uptake model.

Table 8 Payback thresholds for return on investment by market sector[22]

Market sector	Payback threshold (years)
Residential – low income	1.2
Residential – high income	2.2
Small to medium sized business	2.0
Commercial	3.2
Industrial	4.2

As well as the capital cost of the equipment, the payback thresholds include transaction costs. These reflect the time and effort needed to understand the opportunity and its benefits, source the right product and supplier at the right price and oversee the installation.

Based on a literature review of comparable policies in Australia and overseas, the uptake model assumes that transaction costs add 10-20% to the capital cost of a project.

The S-curve estimates maturity of technology and speed of uptake

In any given year, only some of the total available technical opportunity can be taken up. This is estimated through sigmoid curves (S-curves) which reflect how quickly technologies and services spread as the market matures from early adopters to mass market appeal.

Different technologies also have different maturity levels, influencing the shape of the S-curve and the speed of uptake. Technologies that are early in their development will take longer to penetrate the market. Mature technologies, in contrast, will penetrate more quickly and reach saturation more quickly.

In the uptake model, the S-curve imposes a limit on maximum proportion of each opportunity that can be taken up by consumers each year.

The uptake model provides the functionality to classify technologies as early, establishing and mature. In practice, due to a lack of strong evidence to support alternative classification, all opportunities are classed as establishing. The Department excludes technologies from the modelling as these become business as usual.

Freeriding, spillover and rebound

Energy efficiency programs can be associated with 'freeriding', where participants receive financial incentive for activities that would have occurred anyway. Conversely, programs may have 'spillover' effects, such as consumers choosing to implement more energy efficiency measures than the activities they claim an incentive for.

[22] Payback thresholds drawn from reports prepared for a possible national Energy Savings Initiative, including SKM MMA. (2011). Energy Market Modelling of National Energy Savings Initiative Scheme – Assumptions Report, prepared for Australian Government's Department of Climate Change and Energy Efficiency (DCCEE); Climate Works Australia. (2012). Inputs to the Energy Savings Initiative modelling from the Industrial Energy Efficiency Data Analysis Project, prepared for DCCEE; Energetics, 2012, Energy use and energy efficiency opportunity data for commercial sector and small/medium business, prepared for DCCEE.

The CBA accounts for freeriders and spillovers through a 'net to gross' energy savings ratio. This balances the amount of savings that would have been undertaken without the ESS (freeriding) with the amount of savings attributable to spillover.

Based on similar programs in comparable jurisdictions, the net to gross ratio is assumed to be a factor of 0.87. As a result, the projected energy and peak demand savings are discounted by 13%. This is consistent with the approach taken in the last ESS review (NSW Government 2015b, p.138). It is a conservative assumption as several studies in the United States have concluded that the impact of freeriders and spillovers net each other off (Haeri and Khawaja 2012).

The rebound effect occurs when energy efficiency activities result in fewer energy savings than expected due to either behavioural or other systemic responses.

Energy savings may be overestimated if the rebound effect is not included in estimates of energy usage where relevant. It does not apply to all types of energy efficiency technologies; for example a new energy efficient fridge will not operate for any more hours per year than the model it replaced.

The rebound effect has been found to be a benefit, not a cost, of energy efficiency policy (Gillingham et al. 2015). For example, a more efficient HVAC system allows homes to be kept at a more comfortable temperature and improves the productivity of residents. The Department does not currently include the rebound effect in its energy efficiency CBAs, but could do so in the future if the impact can be reliably quantified.

Key assumption for the peak demand reduction scheme

Estimating the peak demand reduction opportunity

As is discussed in section 2.2, the peak demand reduction scheme may include three types of activities. These are peak demand saving, response and shifting.

Table 9 shows preliminary estimates of the scheme's impact on New South Wales peak demand using indicative targets. This is based on modelling for the E3 Program's regulatory impact statement for appliance demand response capabilities (DEE 2019) and AEMO's projection of battery systems (AEMO 2019e). The annual peak demand reduction has been reduced by 13% to account for the net impact of free-riders and spillovers.

Table 9 Assumed peak demand reduction to 2030 from indicative targets

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Peak demand reduction (MW)	141	200	274	362	467	588	724	887	1,029

Modelling for the E3 Program considered the following parameters:

- the number of demand response capable units in the stock
- the share of demand response capable units that are activated because their owners choose to participate in a demand response program
- the diversified electrical load of each unit during network peak load events.

Peak demand reduction from battery systems is based on AEMO's (2019a) forecast under the fast change scenario. Not all batteries will be fully charged and available to support the grid at any given time. The available capacity from batteries was therefore reduced by a factor of 0.3-0.5.

Before setting scheme targets, the Department will conduct further research to identify peak demand reduction opportunities in the commercial and industrial sectors.

Costs of the peak demand reduction scheme

As discussed above, the modelled policy impact of the scheme assumes the peak demand reduction scheme will lower annual New South Wales peak demand by up to 1,029 MW by 2030.

For the purposes of this CBA, the Department has estimated the full regulatory cost of achieving this level of demand reduction, including payments from both the peak demand reduction scheme, other market mechanisms (such as dispatch costs for peak demand response) and administrative costs for scheme participants.

The regulatory costs include the scheme's contribution to the following:

- the incremental capital cost of installing peak demand reduction capacity (where these are above business-as-usual, for example not already covered by a regulation or standard)
- the operational costs associated with delivering the peak demand reduction activities (examples of these are customer engagement costs, technology and system set-up costs, and compliance and reporting costs).

To estimate the full regulatory costs, the Department conducted a desktop review of recent similar peak demand reduction programs in Australia.

- **Queensland's peak demand reduction programs managed by Energex and Ergon Energy (used in the CBA)**

  Around 1.1 million customers participate in Queensland's demand management programs, including households, businesses and industrial customers. For 2019-20, the program has a forecast budget of $13.6 million aiming to achieve 71.8 MVA demand reduction. Assuming a power factor of 0.9, this translates to $210,000/MW (Energy Queensland 2019, p.29).

  The forecast budget includes the full cost of implementing the demand management program and achieving the planned demand reduction. Therefore, this provides a reasonable proxy to estimate the regulatory cost of New South Wales peak demand reduction scheme.
- **E3 program's 'smart' demand response capabilities for selected appliances**

  In 2019, COAG Energy Council agreed to introduce demand response capability requirements for air conditioners, electric storage water heaters, devices controlling swimming pool pump units, and EV charger/discharger controllers (DEE 2019).

  The regulatory impact assessment supporting the decision considered regulatory costs associated with the introduction of a demand response standard. These include:
  - design and manufacturing costs passed on to customers
  - the cost of activating and connecting the demand response capability
  - the cost of maintaining records of installed appliances and communicating with participants.

  The costs in the regulatory impact statement are not comparable with the costs of the New South Wales scheme for several reasons.
  - The four appliance types may not be reflective of the technologies taken up under the New South Wales peak demand reduction scheme.
  - The peak demand reduction scheme will reward incremental capital costs above existing regulations or standards.
  - The cost of dispatching the demand response capacity was also not considered in the regulatory impact statement.
- **Australian Renewable Energy Agency demand response RERT trial**

  The Australian Renewable Energy Agency (ARENA) operates a $35.7 million, three-year demand response RERT trial in New South Wales, Victoria and South Australia (ARENA 2019). By demonstrating how demand response can play a role in managing electricity supply during extreme peaks such as summer heatwaves, the trial aims to inform design of new markets or other mechanisms to support demand response.

The NSW Government provided matching funds for projects located in New South Wales ($7.2 million for four projects for total funding of over $14 million).[23]

The trial will deliver 200 MW of capacity by 2020, of which 78 MW is in New South Wales. Projects include residential, commercial and industrial energy users, and use a range of technologies and innovative behaviour change programs to deliver demand response.

The average government cost of projects funded under the trial is about $69,000/MW per year. The full cost including participant co-contributions for the New South Wales projects is around $141,000 per MW. This includes incentives to households and businesses but does not take into account the cost of dispatching the demand response capacity under RERT.

The trial is specifically aimed at increasing capacity for the RERT so may not reflect typical costs for the New South Wales peak demand reduction scheme.

- **Payments made under RERT**

  AEMO makes payment to aggregators under the RERT at times of projected supply shortages in the NEM. As an emergency mechanism, it is triggered infrequently. When RERT was activated in New South Wales on 31 January 2020, the average activation payment was over $9,000 per MWh in addition to pre-activation payments of about $13,500 per MW (AEMO 2020e).

  Of the proposed activities under the peak demand response scheme, peak demand response and shifting may require additional payments to dispatch. These payments may come from a range of sources, including the proposed wholesale demand response mechanism. Payments under the RERT (as an emergency mechanisms) are likely to overstate the cost of dispatching capacity under the peak demand reduction scheme.

Before setting scheme targets, the Department will conduct further modelling to forecast the uptake of peak demand activities and certificate prices under various settings.

[23] For further detail, consult the program website at https://energy.nsw.gov.au/government-and-regulation/helping-consumer/demand-response-program

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